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THE

GLASGOW

MEDICAL JOURNAL

(PUBLISHED QUARTERLY,)

EDITED BY A COMMITTEE

OF THE

GLASGOW & WEST OF SCOTLAND MEDICAL ASSOCIATION.

VOL. II., NEW SERIES.

UNI
MED

GLASGOW:
DUNN & WRIGHT, 26 WEST NILE STREET.
1870.

GLASGOW:
DUNN AND WRIGHT,
PRINTERS.

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THE

GLASGOW MEDICAL JOURNAL.

November, 1869.

Original Articles.

1.—ON THE TEMPERATURE OF CHILDREN IN PHTHISIS AND TUBERCULOSIS.

By JAMES FINLAYSON, M.D., *Manchester.*

THE diagnosis of phthisis* and tuberculosis in children has been acknowledged by all to be full of difficulties. Perhaps, however, this is only truly appreciated by those who have had an opportunity of finding, by dissection, how often tubercles were present when they were scarcely thought of, and how often they were absent, although pretty confidently predicted. The general symptoms and the physical signs, relied on with so much certainty in the adult, vie with each other in their deficiency and delusiveness. Wasting or consumption is often present, to the most extreme degree, in a child with cough, although no trace of tubercle can be found after death; on the other hand, the lungs may be full of tubercle in cases where there has been, apparently, a complete absence of chest symptoms. Sputa of any kind are seldom obtained in the case of young children, and hæmoptysis is extremely rare; night sweats are symptomatic of rickets rather than of phthisis, and the pulse is proverbially fitful and unreliable in the young subject. Of physical signs, percussion is apt to fail, on account of the scattered nature of the tubercular deposit, and of its having but little proclivity to the apex, while the presence of dulness, even if detected, may be due simply to a piece of collapsed lung; feebleness of the respiration may be owing to the same cause, while a degree of harshness in the inspiration is so natural to the child, as to have won for it the name of "puerile" breathing, when heard in the adult. Bronchophony has often to be judged of by the fitful cry of the infant, and deep inspirations cannot be obtained for the asking. The history of disease in the family,—so valuable when it can be obtained,—has frequently not had time to develop its phthisical character in the parents or in their other children; and in the case of numerous fatalities amongst the young members of a family, it is too often impossible, (at least in hospital practice), to discover any shadow of an idea, under the popular names which are assigned as the causes of death.

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* The term *phthisis* is used in this article, as *including* those lesions of the lung, which were formerly described under the name of "*crude or yellow tubercle*," but which are now more generally spoken of as "*caseous deposit*," and are regarded as being, in many instances, due to a degeneration of inflammatory products in scrofulous subjects.

I do not here stop to confirm these statements by my own observations on children, living or dead; much higher authority than mine could be adduced in support of them. I simply mention the difficulties, to show that any further means of diagnosis, troublesome and irksome though it may appear, must have good claims upon our careful attention, seeing that questions of prognosis and treatment are gravely influenced by the view which we take of the nature of the disease. The thermometer has been firmly believed by many to afford valuable assistance in the diagnosis of tubercular disease, even in stages where physical signs can scarcely be expected to be available; some have ranked its claims even higher still. As I believe that tubercular disease is one of the affections of childhood, in which the thermometer may really assist us in the formation of a *diagnosis*, I submit the following cases, in the hope that others also may be induced to contribute towards the elucidation of this subject, by careful and exact observations.*

In this paper, cases with meningeal or cerebral complications are passed over; partly, because in such cases the local disease seems to exercise an undue influence over the temperature,† and partly because it seems better to consider such an important subject in a separate investigation.

Shortly after the revival of medical thermometry, on an exact basis, through the labours of Traube and v. Baerensprung, a valuable treatise on the "*Temperature of the Body in Chronic Febrile Diseases*" was published by Jochmann.‡ The subjects of his inquiry were all affected with chronic lung disease, the greater part of them being tubercular. The measurements were made in the axilla, by means of a thermometer, which was retained there for at least half an hour, but, in all cases, until the mercury had ceased to rise for 10 minutes.§ The observations were made morning and evening, sometimes also at mid-day. Jochmann announced three types of the course of the temperature in such diseases.

Jochmann's Types of Temperature in Chronic Febrile Diseases.

1st Type.—The morning and evening temperatures continue within the normal limits, or nearly so; but, in such a way, that the morning temperature is always somewhat lower than the evening one. (This type seldom continues long in a given case, being disturbed by exacerbations and intercurrent diseases.)

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* I do not mean to disparage the thermometer in other diseases. Most of the fevers and inflammations of childhood, however, can be diagnosed by signs and symptoms which, when well marked, leave little to be desired. On the other hand, when the rash of measles or scarlatina, for example, is obscure, I have found but little assistance from the temperature in diagnosis. In like manner, indications of approaching mischief, before the appearance of other symptoms, have usually seemed to me too vague to be of much service. I must, however, make an exception in favour of enteric fever. Owing to the frequent absence or indistinctness of the "rose spots" in children, this disease is often very obscure. I believe I have found the temperature of very considerable assistance in the diagnosis of such cases. Its course, in any disease, cannot fail to be of scientific interest.

† It is stated, for example, that after the onset of basilar meningitis, the high tubercular fever, previously existing, may become much diminished.

‡ *Beobachtungen über die Körperwärme in chronischen fieberhaften Krankheiten*, von Dr P. A. Jochmann, Berlin, 1853. I am acquainted with this work only through the excellent digest by Wagner in *Schmidt's Jahrbücher*, 1854. Bd. 81; pp. 117–120.

§ This is in accordance with v. Baerensprung's method.

2nd Type.—The morning temperature is normal, or even below the normal, whilst the evening temperature is abnormally high.

A. The evening temperature is only slightly above the normal. (A frequent type, and one pretty uniform in its course.)

B. The evening temperature goes considerably beyond the normal, while the morning temperature remains at, or below, the normal. (Type of an intermittent, may be quotidian or tertian in its course. Not very uniform in its type.)

3rd Type.—The temperature continues constantly over the normal.

A. The temperature highest in the evening. (A frequent type, and one pretty uniform in its course.)

B. The temperature higher in the first hours of the morning than at the other observations. (Not uniform in its type.)

C. The temperature rises considerably in the forenoon; although abnormally high both at morning and night—sometimes higher at the one time, sometimes at the other—it is highest of all at mid-day. (Pretty uniform in its type.)

Jochmann remarks that an uncommonly high temperature, at one observation, is often succeeded by an unusually low one at the next; and that when there is a higher intensity, or longer continuance than usual, of the fever process, a considerable fall,—after the manner of a pseudo-crisis,—may occur. Unusually low temperatures, however, may occur without any preceding exacerbation of this description; he adds, that an abnormally low temperature, at one observation, is succeeded only seldom, and that accidentally, by an unusually high one.

I give these conclusions at some length, as, notwithstanding their date, they do not seem to have been superseded;* this is, no doubt, owing to the excellence of the method which the observer pursued.

The following remarks, on *The Temperature in Acute Miliary Tuberculosis*, by Wunderlich, are valuable for our present purpose, as coming from one of such vast experience in the use of the thermometer, and as referring to a form of tubercular disease, much more common in the child than in the adult. As the chapter is not a long one, I give it in full :—

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* Spielman, in his inaugural treatise, ("*Des modifications de la témpérature animale dans les maladies fébriles aiguës et chroniques*," Strasbourg, 1856. Analysed fully in *Schmidt's Jahrbücher*, 1857, Bd. 93.) falls back on Jochmann's observations when treating of *chronic* febrile diseases. Wunderlich, in his chapter, "*Chronische Störungen des Blutes*," &c., also refers to Jochmann's work. (*Das Verhalten der Eigenwärme in Krankheiten*, von Dr C. A. Wunderlich. Leipzig, 1868.)

"Acute miliary tuberculosis is attended, in most cases, by a conspicuous departure from the usual degree of temperature, and, in general, this occurs all the sooner, in proportion to the abundance and diffusion of the deposit, and to the freedom of the temperature from disturbances, before the formation of the miliary granulations.

"In cases of sparse and limited miliary tubercle, and in patients who have already been affected with severe diseases, (such as advanced phthisis, pneumonia, cerebral diseases, &c.,) the influence of miliary tuberculosis on the temperature is wanting, or, at least, is small. The course of the temperature in miliary tuberculosis is observed under the following main types :—

"*(a)* At first, like the temperature in a catarrhal* fever; later on, like an intense hectic fever.

"*(b)* Like the course of the temperature in abdominal-typhus. *(Enteric fever).*

"*(c)* Like the course of temperature in an intermittent fever.

"These three different forms may succeed, the one to the other, in one and the same case.

"The *first form* occurs in cases having a sub-acute course. The illness in the beginning—at least so far as the temperature is concerned—is exactly like the course of an intense influenza, or of a catarrhal pneumonia, only the persistent continuance of the fever awakes suspicion. Gradually, deep remissions, which may even reach the normal temperature, take place;—these alternate with marked evening exacerbations of the fever. Still, with this form, the discrimination of acute tuberculosis from acute phthisis without tubercles, is impossible, and continues so till death,—at least, in the absence of meningeal tubercle, and the characteristic course of basilar meningitis.

"In the *second form*, the discrimination of this disease from a typhoid fever, is often impossible for a long time, and may continue so even on till death. Still, the course of the temperature in acute tuberculosis is more irregular than is commonly the case in abdominal-typhus; the remissions are usually somewhat lower than in the latter disease, and not unfrequently even reach the normal temperature. The cases of acute tuberculosis, with a typhoid fever course, are, commonly, most rapidly fatal. When, exceptionally, life is prolonged further, the fever assumes, in its later course, another character,—either that of a hectic, or of an intermittent fever.

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* Probably Wunderlich's idea on this point is represented by the following sentence from his chapter on catarrhal affections, page 334.—"In many cases the disturbance of the temperature is wanting, or, at least, shows itself only as a somewhat greater daily fluctuation than occurs in health, so that the evening temperature exceeds the normal, and shows either a sub-febrile elevation, or a considerable fever height."

"The *intermittent type*, in acute tuberculosis, occurs, without doubt, the least frequently of all. The range of temperature in each access of the fever may perfectly resemble that of an intermittent, and even show the same regularity, so that it may repeat itself in tertian or duplicated quotidian rhythm. Still, the presence of acute tuberculosis is to be suspected, in that the accessions begin especially after mid-day, and that the heights reached by the temperature are somewhat less than those attained in the course of an intermittent, while on the other hand, in the non-febrile stage, the temperature commonly goes more below the norm than it does in an intermittent. In the further course of acute tuberculosis, the intermittent character of the fever is lost, and the subsequent occurrence of a slighter remittent fever confirms the diagnosis, in case this has not already been established on other grounds."*

A careful consideration of these two statements of tubercular temperatures,—acute and chronic,—will show, I think, that three types may clearly be recognised, and that these may be made to include all the different forms described.†

TYPE I.—Morning temperature, normal or subnormal. Evening temperature, *more or less* elevated.

TYPE II.—Morning and evening temperatures both abnormally high, with distinct tendency to evening exacerbations.

TYPE III.—Morning and evening temperatures both abnormally high; exacerbations, without any constant or obvious reference to the time of day.

The second type may be regarded as an intermediate form between the first and third. Thus, in all three, the evening temperature *may* reach the same point—say, 104° F. (40° C.)—but while in the first type the morning temperature is normal, in the second it is distinctly elevated, and in the third it may even overtop the evening one.

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* "*Das Verhalten der Eigenwärme in Krankheiten.*" Leipzig, 1868. Chapter xxii.

† Jochmann's divisions and subdivisions are evidently too complex to come into use in this country. M. Hirtz (Article *Chaleur: Nouv. Dict. de Méd. et Chir. Prat.* Paris, 1867,) gives Jochmann's main divisions, disregarding the subdivisions, which, however, are obviously of much importance. I think I have preserved the force of these, and of Wunderlich's classification in the three types announced. Compare with the three types here given, the three varieties or forms of acute tuberculization in children, laid down by Sir Wm. Jenner, "The insidious, the active febrile, and the adynamic."—(*Med. Times and Gazette*, 1861, Vol. II., p. 3.)

In Dr Sydney Ringer's valuable monograph on the temperature in phthisis,* there are notes given of the cases of 24 patients. Of these, 9 were children. Of the 9 children, 1 died from cerebral tumour—not tubercular—(the case being apparently inserted for the sake of comparison,)—and other 2 had cerebral or meningeal complications. This leaves 6 cases; of these he only gives details in 2, summarizing the temperature in the other 4. The following is an abstract:—

Dr Ringer's Cases of Tubercular Children.†

Case 13.—Boy, aet. 6 years. Tubercular granulations in lung, tubercular peritonitis, &c.

Morning temperature, "normal."

Evening temperature, from April 23 to May 18, 103° F. (39°.44 C.)‡ After this it declined, and from June 1 till death, June 12, it was "normal."

Case 15.—Boy, aet. 10 years. Well marked symptoms of phthisis, somewhat chronic in its course. Observed from June 6 till removal on July 9.

Morning temperature, from 100° F. to 101° F. (37°.77 to 38°.33 C.) Latterly, 97° F. to 98° F. (36°.11 to 36°.66 C.)

Evening temperature, from 102° F. to 103° F. (38°.88 to 39°.44 C.)

Case 20.—Girl, aet. 3 years. Tubercular granulations in lungs; a small cavity. Observed from April 28 till death on May 16.

Morning temperature, "normal;" or sometimes as low as 94° F.—95° F. (34°.44—35° C.)

Evening temperature, always 102°, 103°, or 104° F. (38°.88—39°.44—40° C.)

Case 22.—Girl, aet. 8 years. "Acute general tuberculosis, with very extensive deposit in left lung."

Morning temperature, generally "normal."

Evening temperature, 103°—104° F. (39°.44—40° C.)

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* *On the Temperature of the Body as a Means of Diagnosis in Phthisis and Tuberculosis.* By Sydney Ringer, M.D. London, 1865.

† It will be observed that I notice Dr Ringer's work, only so far as it concerns children.

‡ As the desirability of having an uniform notation for medical purposes is most obvious, and as the Centigrade thermometer is certain to supersede Fahrenheit's scale in England, just as it has already superseded Reaumur's in Germany, I append the equivalent of all general statements or average results in this notation,—the calculation being made to two decimal places. The use of Fahrenheit degrees can scarcely yet be dispensed with for English readers. The equivalents are given *exactly* in all cases; this must be remembered as accounting for the awkward appearance, when round numbers are really meant to be stated.

In the two following cases, particulars of the temperature are given in diagrams:—

Case 11.—Girl, aet. 7 years. Physical signs of phthisis well marked. Observed from April 9 till April 25.

Morning temperature ranged from 96° to 100°.2 F. (35°.55 to 37°.88 C.)
" " averaged 96°.92 F. (36°.06 C.)
Evening temperature ranged from 96°.4 to 101°.2 F. (35°.77 to 38°.44 C.)
" " averaged 98°.93 F. (37°.18 C.)

Case 8.—Girl, aet. 8 years. Lungs much condensed in upper lobes; cavities with thick fibrous walls; cretaceous masses and obsolescent granulations, "but no recent tubercle found." Large and small intestine ulcerated. In the floor of some of the ulcerations, "little bodies looking like tubercles." No tubercles seen on peritoneum or omentum.

Morning temperature ranged from 97°.4 to 100°.4 F. (36°.33 to 38° C.)
" " averaged 98°.42 F. (36°.9 C.)
Evening temperature ranged from 97° to 100° F. (36°.11 to 37°.77 C.)
" " averaged 98°.53 F. (36°.96 C.)

The hours of observation in Dr Ringer's cases seem to have been generally about 9 a.m. and 8—10 p.m. The temperature was taken in the axilla. No definite statement is made as to the length of time during which the thermometer was applied, but from his directions,* it would seem that five minutes were reckoned quite sufficient. No statement is made as to how we are to interpret the frequently recurring word "normal;" but in his remarks on the case of non-tubercular tumour, he says, "the temperature during the greater part of the time the child was under observation, remained normal." (p. 34.) From Aug. 14 to Aug. 20 seems the period referred to, as the temperature was distinctly elevated, both before and after these dates.

Case 9.—Boy, aet. 4 years. Cerebral tumour, non-tubercular. Temperature regarded as normal by Dr Ringer from Aug. 14 to Aug. 20:—

Morning temperature ranged from 98°.2 to 99°.6 F. (36°.77 to 37°.55 C.)
" " averaged 98°.88 F. (37°.15 C.)
Evening temperature ranged from 97°.6 to 99°.2 F. (36°.44 to 37°.33 C.)
" " averaged 98°.42 F. (36°.9 C.)

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* "All these precautions being taken, it is better to allow the thermometer to remain in the axilla at least five minutes." (p. 3.)

Dr Ringer seems to believe that there is a "continued elevation of the temperature in *all* cases of tuberculosis and tuberculization," and that "we are able, by means of the temperature, to ascertain the existence of tuberculosis, before we can detect any physical signs, and when the symptoms are inadequate to justify a diagnosis;" and further, that "when patients present themselves with physical signs indicating marked consolidation of the apices of the lung, we are justified in saying, if the temperature is normal, that the "deposition in the lungs has ceased, and that the tuberculosis is in abeyance." (pp. 26, 28, 29.)

In confirmation of this last statement, he adduces *Case* 8, (of which I have given an abstract,) believing that the inspection showed the tuberculosis to have been arrested. On comparing it, however, with *Case* 11,—one of marked phthisis,—we only find a difference of less than ½ degree Fahr. (0°.27 C.) between the average evening temperatures in the two cases; this seems much too small a difference on which to rest such an important distinction. Moreover, few readers can readily believe that, with tubercular cavities in the lungs and tubercles in the intestines, with cough, diarrhœa, and progressive emaciation continuing up to death, the tuberculosis was quite in "abeyance." The assertion of a "continued elevation of the temperature in *all* cases of tuberculosis," has seemed to many* an overstatement of the value of the thermomter, such as is only likely to bring it into discredit. Putting aside *Case* 8, in which the evening temperature is regarded as not being abnormally elevated, and *Case* 11, in which it was only 0°.4 F. (0°.22 C.) higher, we find in *Case* 13, that from June 1st till death on June 12th, the temperature was "normal;" it is difficult to see how Dr Ringer announced his proposition without some reservation; of course, if the arrest of the tuberculosis, a few days before death, be alleged in this case also, the practical value of the proposition disappears.

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* "I have made a good many observations since Dr Ringer published his results, and so far, my results tend, partially, to confirm his observations. I have, however, certainly met with some cases of tubercular disease, in which the morbid process appeared to be making decided progress, in which there was no distinct elevation of the temperature." *Diseases of Children.* Thomas Hillier, M.D. London, 1868. Page 115. See also M. Hirtz (*op. cit. page* 793), "Il est dit que la tuberculose, même alors qu' elle ne traduit encore par ancun symptôme ni signe physique, peut se diagnostiquer par le thermomètre. Nous nous inscrivons énergiquement contre une pareille assertion."

A notable feature in Dr Ringer's observations is the frequency with which exceedingly low temperatures seem to have been recorded,—94° to 97° F. (34°.44 to 36°.11 C.) being frequently obtained at the morning observations. Now, although quite aware of the occasional occurrence of unusually low temperatures, I cannot but think that their *frequency* is due to the method pursued in applying the thermometer. Taking the temperature in a young child's axilla,—especially in phthisical cases,—is, at the best, apt to be unsatisfactory; much more so, if only 5 minutes be allowed for the rise of the mercury, in even the most sensitive thermometer. Ziemssen has published some observations on this subject. He found that in children, after every precaution, the mercury continued rising usually for 15 minutes after its introduction to the axilla, and sometimes even for 20 minutes.* Of course, when the temperature is high, the maximum is reached much sooner, so that the inevitable tendency of this method is to *exaggerate the fluctuations* to an enormous extent.† I must say that I agree with Ziemssen, in regarding temperatures taken in the axilla of emaciated children, in the course of 5 minutes, as having but slender claims to scientific accuracy.

Ziemssen‡ has pointed out the value of the thermometer, as an aid to the discrimination of infiltrated tubercle from pneumonia of the apex. This form of pneumonia is, in the child, often quite unconnected with tubercular deposit. In infiltrated tubercle, the temperature seldom, or only exceptionally, reaches the height usually attained in lobar pneumonia; while the great daily variations, and the striking morning remissions, so characteristic of tubercular temperatures, do not occur in the other disease. He gives, as an illustration, a case of miliary tuberculosis (granulations), in an infant 9 months old. The temperatures were taken in the rectum from Feb. 9 till Feb. 15.

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* *Pleuritis und Pneumonie im Kindesalter*, von Dr Hugo Ziemssen, Berlin, 1862. Page 10. (I may say this accords with my own experience.)

† Ziemssen has further shown (*Klinische Beobachtungen über die Masern und ihre Complicationen mit besonderer Berücksichtigung der Temperaturverhältnisse*, von Prof. Hugo Ziemssen und Dr Paul Krabler. *Griefswalder Medicinische Beiträge*, Bd. 1. Danzig, 1863. Page 124-5.) by comparative experiments, that the accurate temperature of the axilla in children is a less reliable index of the internal heat than it is in the adult. This, no doubt, further favours the record of "collapse temperatures" in young subjects, when the measurements are made in this situation. Further, it is well known that even in the adult, "collapse temperatures" may be obtained in the axilla, (as in some cases of cholera,) even at a time when the temperature of the rectum is considerably above the normal. (See *Glasgow Medical Journal*, May, 1867.)

‡ *Pleuritis*, &c. Page 246.

Morning temperature ranged from 37° to 38°.2 C. (98°.6 to 100°.76 F.)
" " averaged 37°.64 C. (99°.75 F.)
Evening temperature ranged from 38°.1 to 39°.8 C. (100°.58 to 103°.64 F.)
" " averaged 39°.10 C. (102°.38 F.)

On the day before death, there was a marked fall in the temperature, (fully 1° C.—1°.8 F.), showing thus a striking contrast to the course observed in fatal pneumonia, in which the temperature attains a maximum in the agony.

In his valuable clinical treatise on *Measles*,* Ziemssen refers to the continuance and protracted course of the fever, coupled with evening exacerbations of the temperature, as being very suggestive of the occurrence of tuberculosis, after this disease, when no other cause can be assigned for the continuance of the fever. He only gives, however, the notes of one case in illustration.

The subjects of the following observations were patients in the *Manchester Clinical Hospital for Children*, and were under the care of Dr Whitehead and Dr Gumpert, who, with their usual kindness, have allowed me the free use of their cases. The temperatures were taken in the rectum† at the hours stated, and in the manner described in my former paper on the normal temperature of children.*

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* *Op. Cit.* Pp. 271, 274.

† A few observations, specially marked, were made in the axilla in Case 1, the thermometer being applied for at least 20 to 30 minutes. The rectum, as contended by Ziemssen, is by far the best place for taking thermometrical observations in children. The difficulty is certainly not greater, (I believe

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Case I.

Mary Conolly, aet. 4 years, (a twin; her other 3 brothers and sisters all alive,) was admitted to the ward, June 11th, 1867. Had measles 3 months before that time; since then has been delicate, and for last month, there have been diarrhœa, occasional slight cough, and emaciation. Dulness on percussion, with deficient respiratory sounds, was well marked on the left side, in front. By and by, dulness of the apices was obvious; the breathing was bronchial, sometimes very hollow, and occasionally clicking râles were heard on the left side. The dulness in left mammary region varied considerably in extent and depth, and seemed to indicate the presence of effusion. On the right side, auscultation was comparatively good. The cough was trifling, the diarrhœa severe and uncontrollable, and the emaciation extreme. *Treatment* consisted in the administration of tonics (iron and quinine), and of small doses of opium and astringents. Cod liver oil was tried, but it did not agree. From July 2nd, small doses of brandy (½ oz. per day) were given. Diet: milk, beef-tea, meat, and bread. Death occurred early on the morning of August 17th. *The inspection* was made 56 hours later. The whole of left lung was adherent to chest, except at a small portion of the base behind. The margin of lung adjoining pericardium was quite indurated,—perfectly stuffed with tubercles, beginning or advancing in softening. This lung contained two very large cavities, one at the upper part, the other towards the base. The right lung was partially adherent at the apex; there was a little fluid in the pleura. On section, numerous patches of tubercle were seen in various stages of softening, throughout the upper two-

much less,) even in restless children, than when the axilla or groin is used. The rapidity and certainty of the results obtained contrast strongly with the tedious and unsatisfactory character of axillary measurements. Nor have I found, even in dispensary practice, that the mothers of the children, (a sufficiently prejudiced class) make any objection to this proceeding. The patient, if in bed, is made to assume a position on the left side, such as is usually recommended for obstetrical operations in this country; the thermometer is oiled, and carefully introduced within the anus. While one hand holds the instrument gently and steadily, the other may lie lightly on the pelvis or buttocks, to guard against movement. If disposed to be restless, I usually found, that by getting the nurse to engage the child's attention, or by doing so myself, this tendency soon passed off. In infants, or young children very restless from disease, a similar position on the mother's lap, with the face directed to her right breast, is the most suitable. The position indicated involves no exposure to the air. This method, at which one arrives quite naturally, I found afterwards to be that recommended by Ziemssen, (see especially the introduction to his inquiry on *Measles*,) with whose high recommendation of it I can perfectly agree.

* *Glasgow Medical Journal*, Feby., 1869.

thirds of lung; some deposit existed in lower third also. A large cavity occupied the centre of this lung. Bronchial and mesenteric glands large and hard. No affection of peritoneum. Large and small intestine presented numerous ulcerations and inflamed glands. Some of the ulcers in ileum were of transverse character, as if tubercular in origin. Other organs not remarkable.

Date.	Morning, 7 A.M.	Aftern'n, 2 P.M.	Evening, 9 P.M.	Date.	Morning, 7 A.M.	Aftern'n, 2 P.M.	Evening, 9 P.M.
1867.	Fah.	Fah.	Fah.	1868.	Fah.	Fah.	Fah.
July 2			100°.6	July 25	99°.9	98°.9	100°.3
" 3	97°		*101°.2	" 26	98°.4	99°.2	102°
" 4	99°.2		*102°.1	" 27	97°.4	100°.8	102°.6
" 5	99°.2	100°.2	101°.7	" 28	97°.7	98°.7	103°.2, p. 140
" 6	101°.5		102°	" 29	98°.2	97°.4	98°.4
" 7	99°.4	102°	103°.3	" 30	98°	99°.6	100°
" 8	...	97°.8	103°.2	" 31	98°.8	100°	102°.4, p. 130
" 9	99°	99°.1	100°.2	Aug. 1	99°.2	99°.6	100°.2, p. 122
" 10	100°.2	100°.2	103°.2	" 2	...	101°	100°.8
" 11	100°	*101°.2	102°	" 3	99°.2	102°	102°.1, p. 130
" 12	100°	*101°.4	*102°.5	" 4	100°.5	99°	98°4
" 13	*100°.2	*99°.6	*102°	" 5	99°.6	102°.2	99°.6, p. 114
" 14	*100°.3	*99°.7	*101°.8	" 6	97°.6	101°	102°.4, p. 136
" 15	100°.8	99°.6	102°.6	" 7	98°.1	100°.3	102°.2, p. 140
" 16	99°.5	99°.9	99°.4	" 8			*102°.4, p. 140
" 17	101°.6	101°	103°	" 9			*101°.7, p. 120
" 18	99°.4	101°.4	103°.7	" 10	Morning, 7 A.M.		102°.7, p. 120
" 19	99°.4	100°.8	103°.6	" 11	97°.6, p. 106		101°.8, p. 120
" 20	99°.6	101°.4	102°.9, p. 130	" 12	97°.6, p. 120		99°.2, p. 106
" 21	99°.9	101°.5	103°.4, p. 138	" 13	101°, p. 115		99°, p. 112
" 22	100°.5	99°	102°.2, p. 130	" 14	98°.1, p. 105		101°.3, p. 120
" 23	98°.5	98°.1	100°.2, p. 136	" 15	96°		96°.8, p. 90
" 24	100°.8	98°.1	97°.1, p. 100	" 16	95°.8, p. 90		97°.4, p. 104
				" 17	Died 3.30 a.m.		

* Temperatures marked thus, were taken in axilla: all others in rectum.

SUMMARY.

Average of Observations:—
Morning, 7 a.m. (40 obs.) 99°.11 F. (37°.28 C.)
Afternoon, 2 p.m. (33 ") 100°.05 F. (37°.80 C.)
Evening, 9 p.m. (46 ") 101°.32 F. (38°.51 C.)

Lowest temperature (morning before death), 95°.8 F. (35°.44 C.)
Highest temp., 103°.7 F. (39°.83 C.)
Evening temperature was under 100° F. (37°.77 C.) on 9 occasions only, out of 46 observations.

Temperature was unusually low during the two days before death:—Mean: Morning, 95°.9 F. (35°.5 C.); Evening, 97°.1 F. (36°.16 C.) A similar, but slighter, degradation of the temperature occurred on July 24th, when the evening temperature reached 97°.1 F. (36°.16 C.)

Case II.

Katherina Weitzil, aet. 3½ years, a well-nourished child, was admitted to ward, Feby. 21, 1868. (Father and mother healthy, their other two children living and strong.) She applied at dispensary a month before, with obscure and slight febrile symptoms; said to have had " jaundice " recently. Abdomen was large, tongue furred, and the motions described as dark and offensive. Her father had just had typhus, and the child's febricula was, at first, thought to be connected with this fact. Under treatment, by acids and quinine, she improved a little. She had, however, fallen off again at date of admission. The tongue was still foul, and she complained of her belly. As it was found that the child was fed with coffee and other unsuitable articles of diet, the continuance of the illness was now ascribed to this fact. Under observation her condition varied much;—sometimes she appeared almost perfectly well, at other times very febrile and languid; she occasionally complained of her belly. Bowels irregular; motions often large, lumpy, and dark-coloured; seldom loose. Her general appearance was still plump, and afforded little confirmation of the diagnosis of *tabes* in such a young child. This diagnosis was made mainly on the strength of the thermometrical indications. *Treatment* consisted chiefly in the administration of tonics (iron and quinine), and in regulation of the diet. Diarrhœa supervened, emaciation set in, and her parents desired her removal. She still continued under observation at the dispensary. Diarrhœa became severe, and there was rapidly progressing emaciation; ultimately she presented the typical aspect of mesenteric disease. She died on May 12th, at her own home, where I made an *inspection* twelve hours later. The omentum and some intestinal coils were considerably matted together in the whole of hypogastric region. Mesenteric glands excessively enlarged; section like a parsnip. Lungs with a few grey miliary tubercles (granulations). No ulcers near ileo-cœcal valve. Brain not examined.

Date.	Morning, 9 A.M.	Evening, 11 P.M.	Date.	Morning, 9 A.M.	Evening, 11 P.M.
1868.	Fah.	Fah.	1868.	Fah.	Fah.
Feby. 22	...	100°.8	March 7	98°.4	101°.2
" 23	98°.1	100°.3	" 8	...	102°.8
March 2	...	101°	" 9	...	103°
" 3	99°.8	101°.2	" 10	99°.4	...
" 4	99°	103°.2	" 23	...	99°.3
" 5	99°.4	103°.1	" 24	98°.6	99°.6
" 6	...	102°.4	" 25	98°.6	100°.5

SUMMARY.

Average of observations:—
Morning, 9 a.m. (8 obs.) 98°.91 F. (37°.17 C.)
Evening, 11 p.m. (13 ") 101°.41 F. (38°.56 C.)

Lowest temp., 98°.1 F. (36°.72 C.)
Highest " 103°.2 F. (39°.55 C.)
Lowest evening temperature, 99°.3 F. (37°.38 C.)

CASE III.

John Dixon, aet. 7½, was admitted to ward, November 12, 1868. For six months, severe cough, with phlegm; breath and expectoration fœtid, as if gangrenous. Cough very harsh. Percussion very dull under right clavicle, but dulness much deeper and more extensive on left side. Fine crepitus at right apex; over left upper lobe, the râles were metallic, and occasionally gurgling in character. Breathing bronchial and hollow on both sides, but, on left side, it was cavernous; loud pectoriloquy; marked flattening and deficiency of expansion over left upper front. Profuse perspirations were frequently observed. Appetite was very poor, and general state extremely feeble and prostrate on admission. *Treatment*, in addition to the administration of nutricious food, and of 2 oz. of wine, consisted in the use of opiates and carbolic acid for the first few days. This was followed by sulphuric acid and quinine, and, later on, by iron and cod liver oil. Occasional applications of croton oil were made to the chest. The child improved rapidly, the fœtor soon disappeared, and the cough became less severe; the appetite improved, and the boy began to gain flesh. The signs in chest also seemed better at times, but no very appreciable change in this respect could be announced, even when dismissed in May, 1869. (This case presented an unusually close resemblance to phthisis, as observed in the adult.)

FIRST SERIES.

Date.	Morning.		Evening.		Date.	Morning.		Evening.	
1868.	Hour.	Fah.	Hour.	Fah.	1868.	Hour.	Fah.	Hour.	Fah.
Nov. 12	...	...	9 p.m.	100°	Nov. 29	10	99°.4	9	99°.2
" 13	7¾	99°	8 "	101°.6	" 30	10	99°.3	8¼	98°.4
" 14	...	...	1 a.m.	100°	Dec. 1	10¼	99°.8	9¼	102°.1
" "	8¾	99°.6	8½ p.m.	100°	" 2	9½	99°.4	8¼	100°.8
" 15	9¼	98°.7	10½ "	99°.5	" 3	9½	99°.6	8¾	99°
" 16	...	...	9¼ "	99°	" 4	10¼	99°.9	8½	99°.6
" 17	9½	98°.8	8½ "	100°	" 5	...	...	...	98°.8
" 18	10½	98°.1	8½ "	100°	" 6	10	99°.6	9	99°.7
" 19	10¼	98°.8	8½ "	100°.5	" 7	...	...	8½	99°
" 20	10¾	99°.1	8¾ "	99°.9	" 8	...	...	9	99°.4
" 21	10¼	100°.2	8¾ "	99°.4	" 9	10	100°	8¼	99°.6
" 22	9¾	100°.1	8½ "	101°	" 10	9¼	98°.4	9	99°.8
" 23	10¼	100°.3	8½ "	99°.1	" 11	9½	99°.6	9¼	98°.4
" 24	10	100°	8½ "	99°.4	" 12	10	100°.2	...	...
" 25	9¾	98°.8	9 "	99°.2	" 13	8¾	100°.4	10	99°.4
" 26	9	101°.5	...	...	" 14	8¼	101°.4	9¼	98°.8
" "	12 noon	100°.2	8½ "	101°.8	" 15	9¾	99°.6	9	100°
" 27	9	99°.4	8½ "	100°.2	" 16	...	...	9½	99°
" 28	10¼	100°.2	8¾ "	98°.4	" 17	...	...	9	101°

Weight, 28 lbs. on November 16th. Weight, 35 lbs. on Dec. 25th.

SUMMARY.

Average of observations:—	Lowest temp., morning, 98°.1 F. (36°.72 C.)
Morning, about 10 a.m. (30 obs.) 99°.64 F. (37°.57 C.)	Do. evening, 98°.4 F. (36°.88 C.)
Evening, about 9 p.m. (36 obs.) 99°.75 F. (37°.63 C.)	Highest temp., morning, 101°.5 F. (38°.61 C.)
	Do. evening, 102°.1 F. (38°.94 C.)

SECOND SERIES.

The hours of observation were altered, so as to ascertain what changes the temperature underwent in the evening.

Date.	7½ to 8 a.m.*	12 Noon.†	7 p.m.‡	10 p.m.
1868.				
Dec. 30	...	...	100°.4 F.	98°.4 F.¶
" 31	99°.2 F.	...	100°.8	99°.8§
1869.				
Jan. 1	99°.8	...	100°.4 (asleep)	98°.8§
" 2	100°.2	99°.2 F.	102° (sick)	100°.2§
" 3	100°.8	99°.2	...	98°.8§
" 4	99°.4	...	101°	100°.6§
" 5	99°.6	100°.4	101°.6 (asleep)	99°.6§
" 6	99°.4	100°.1	100°.6	100°.2§
" 7	99°.2	...	99°.2	98°.2§
" 8	100°.6	99°	101°.1	99°.6‖
" 9	99°.6	99°	100°.2	99°.6
" 10	99°.6	99°	99°.6	99°.4§
" 11	99°.6	100°.4	100°.6	99°.6
" 12	99°.4	100°.6	99°.6	99°.6‖
" 13	99°.4	99°.6	100°.2	99°.6§
" 14	99°	...	99°.6	99°.6
" 15	99°.6	100°.6	...	99°
" 16	99°.8	...	99°.8	100°.1
" 17	99°.6	99°.8	...	100°
" 18	99°.6	100°.2	99°.8	99°.6
" 19	99°.4	...	99°	99°.6
" 20	99°.6	100°.1	99°.6	...
" 21	100°	100°.1	99°.8	99°.8

* After breakfast, but before rising from bed or washing. † Before dinner.
‡ Just after going to bed. ¶ Asleep for 2¾ hours. § Asleep for 3 hours. ‖ Asleep for 2 hours.

SUMMARY.

Average of Observations.

7½ to 8 a.m. (22 obs.), 99°.65 F. (37°.58 C.)	7 p.m.,.........(20 obs.), 100°.24 F. (37°.91 C.)
12 noon,.........(15 "), 99°.82 F. (37°.67 C.)	10 p.m.,.........(22 "), 99°.53 F. (37°.51 C.)

CASE IV.

Sarah Riley, aet. 4¾ years, admitted to ward, Feb. 25, 1868. (Father and mother alive; of family, 5 children living and 5 dead.) Said to have had a "slow fever" 2 months before, from which she was recovering, although cough had not ceased,—when she began, 3 days before admission, to have feverishness and loss of appetite, while at the same time, she coughed much more. Deep dulness on percussion, of the whole of the left side of chest, was associated with loudly bronchial breathing, and fine crepitant râles. Pulse 140. The case was regarded, at first, as one of lobar pneumonia. The dulness and râles continued on left side, and some wheezing and occasional clicking appeared in the right lung. The evening temperatures being very high, and the general health failing, the prognosis became very grave,—little doubt being now entertained of the tubercular nature of the disease. The parents removed the child on March 17th, as they wished her to die at home; severe diarrhœa supervened, and she sank on March 22d. The *inspection*, made at her home, showed both lungs to be stuffed with tubercles, the left being more consolidated than the right; there were cavities in both lungs. Bronchial glands a cheesy mass; mesenteric glands enlarged; no ulcerations near ileo-cœcal valve; brain normal.

Date.	Morning, 9 a.m.	Evening, 11 p.m.	Date.	Morning, 9 a.m.	Evening, 11 p.m.
1868.			1869.		
Feby. 25	...	101° F.	March 3	99°.8 F.	103° F.
" 26	101°.2 F.	103°.8	" 4	100°	103°.8
" 27	...	104°.2	" 5	98°.5	104°.2
" 28	100°.6	102°.6	" 6	...	104°.1
" 29	100°.6	104°	" 7	100°.2	104°
March 1	100°.8	104°	" 8	...	104°.2
" 2	...	104°.2	" 9	...	104°.4
			" 10	99°.8	...

SUMMARY.

Average of Observations:—
Morning, 9 a.m. (9 obs.), 100°.16 F. (37°.86 C.)
Evening, 11 p.m. (14 "), 103°.67 F. (39°.81 C.)

Lowest temp, 98°.5 F. (36°.94 C.)
Highest " 104°.4 F. (40°.22 C.)
Lowest evening temp., 101° F. (38°.33 C.)

Case V.

Eliza Skinner, aet. 10 years, admitted to ward, August 20, 1867. She came first under observation at the dispensary in Feb., 1867, having then marked signs of ascites and hydrothorax, and also of consolidation of the apices of the lungs. Abdominal swelling dated from measles 4 years before, and was accompanied occasionally with anasarca; the urine was free of albumen. The disease was then regarded as undoubtedly tubercular. Under treatment, considerable improvement occurred, but this was variable in character. At date of admission, there were considerable dyspnœa and severe pain in chest, with friction sounds; apices of lungs afforded dulness on percussion, with bronchial breathing, and, occasionally, fine mucous râles; distinct fluctuation was obtained from fluid in the peritoneum; the superficial abdominal veins were distended; no enlargement of liver or spleen; considerable œdema of limbs and vulva; no albumen in urine. Under treatment, cough, pain, and œdema disappeared more or less completely, still leaving, however, some degree of dyspnœa and ascites; the signs in chest remained as before, except that the râles passed off two or three days after admission. After dismissal, child was not seen, but the abdominal swelling became greater, and tapping was said to have been practised; the general state was not improved. Mild diuretics and small doses of Dover's powder were given at first, latterly tonics and cod liver oil. From September 10th, 2 oz. of wine daily.

Date.	Morning, 7 a.m.			Evening, 9 p.m.		
1867.	Temp.	Pulse.	Respir.	Temp.	Pulse.	Respir.
Aug. 24	...	...	...	102°.6 F.	126	40
" 25	101°.5 F.	120	35	102°.5	112	37
" 26	100°.7	110	33	102°.1	112	40
Sept. 6	...	...	...	101°.7	105	40
" 7	...	...	...	102°.5	100	40
" 8	99°.9	94	34	102°.1	98	35
" 9	...	...	...	102°.3	99	36
" 10	100°.5	95	36	102°.6	100	40
" 11	100°.3	88	34	102°.2	106	36
" 12	100°.6	100	...	102°.4	100	36
" 13	101°.3	90	34	102°	100	35
" 14	100°.6	90	34	...	...	...
" 24	...	...	...	101°.2	...	...
" 25	...	...	...	102°.1	...	...
" 26	...	...	...	102°	...	...
" 27	...	...	...	101°.6	...	...
" 28	...	...	...	101°.4	...	...

SUMMARY.

Average of Observations.

	Pulse.	Resp.	Temp.
Morn., 7 a.m.	(8 obs.) 98·3,	(7 obs.) 34·2,	(8 obs.) 100°.67 F. (38°.15 C.)
Even., 9 p.m.	(11 obs.) 105·2,	(11 obs.) 37·7,	(16 obs.) 102°.08 F. (38°.93 C.)

Lowest temperature, ... 99°.9 F. (37°.72 C.)
Highest temperature, ... 102°.6 F. (39°.22 C.)
Lowest evening temperature, ... 101°.2 F. (38°.44 C.)

Case VI.

John Ford, aet. 6 years, admitted to ward, May 11, 1868. Had measles 6 months before, which left him with a cough; this had become much worse a fortnight before admission, and was attended with rapid emaciation, and with loss of appetite. The cough was very loud and harsh; there were great emaciation and pallor, considerable feverishness, and some clubbing of fingers. Marked dulness was obtained on percussing left side of chest, especially behind; wheezing and creaking râles, as well as some fine crepitus, were also to be heard. The breathing was very bronchial.

Under treatment, the cough became less severe, but the physical signs seemed rather to be advancing, as crepitus appeared at the right apex also. The general condition was not improved. *Treatment* consisted in giving small doses of morphia and hydrocyanic acid; feeding was also carefully attended to, and a small quantity of claret was given three times daily. The child was removed by the friends, and passed from observation. He died six weeks later; no inspection was obtained.

Date.	Morning, 6 a.m.	Evening, 11 p.m.	Date.	Morning, 6 a.m.	Evening, 11 p.m.
1868.			1868.		
May 13	...	102° F.	May 20	102°.6 F.	104°.4 F.
" 14	102°.2 F.	99°	" 21	103°.6	105°
" 15	101°.6	...	" 22	103°.8	102°.6
" 16	99°.8	99°.4	" 23	104°.4	102°
" 17	102°	102°	" 24	103°.2	103°.6
" 18	100°.2	102°.2	" 25	101°	104°.4
" 19	101°	101°.4	" 26	100°.6	Dismissed by request.

SUMMARY.

Average of Observations.

Morning, 6 a.m. (13 obs.), 102° F. (38°.88 C.)

Evening, 11 p.m. (12 "), 102°.33 F. (39°.07 C.)

Highest temp., morning, 104°.4 F. (40°.22 C.)
" evening, 105° F. (40°.55 C.)
Lowest temp., morning, 99°.8 F. (37°.66 C.)
" evening, 99° F. (37°.22 C.)

CASE VII.

Wm. H. Smith, aet. 10¾ years, admitted to ward, Feby. 21, 1868. (Father healthy. Mother tall, pale, and delicate-looking; of her 6 pregnancies, 1 abortion, 4 children living, and 1 dead.) Began 10 days before, with shivering, vomiting, and cough. Tongue foul, lips dry, aspect somewhat typhoid. Slight dulness on right side of chest behind, where respiration was rather subdued; at the apex it was somewhat bronchial. The existence of dulness in the chest was confirmed after admission; no crepitus was heard, but there was some wheezing, with increased resonance of voice. The tongue became red shortly after admission, with great distinctness of the papillæ; skin a little red, but no rash. Cough continued during his stay; although it was not severe, there was great appearance of dyspnœa and oppression. Feebleness extreme; pulse very soft, 110–120; respirations about 40 per minute. A round worm crawled out from anus 4 days after admission; he was said to have vomited a similar one the day before he was first seen. The skin was covered sometimes with very fine sudamina, but no "rose spots" were seen, although constantly looked for. There was no diarrhœa or abdominal tenderness, and no enlargement of the spleen.

Treatment (apart from a few doses of santonine given after the expulsion of the worm,) consisted in supporting the strength of the patient with food, chiefly fluid; 2 or 3 oz. of wine were given daily; 2 gr. doses of quinine were also given 3 or 4 times daily, and tepid baths were tried; the latter reduced the temperature somewhat,* but no improvement could be said to have occurred; this fact induced the parents to remove the child. I saw him a week after his return home; the symptoms remained as before. On account of the distance of his house, he passed from observation; he was attended by a surgeon from another dispensary, who ordered him cod liver oil. He slowly improved, and by and by regained strength. Glandular swellings appeared in the neck during the course of convalescence. I saw him again on July 13, 1868. "Very much better, but still rather thin; fine hairs on skin; swollen glands on both sides of neck; perhaps a shade of dulness on right side of chest, with obscure râles, and some wheezing."

Date.	3 a.m.	6 a.m.	1 p.m.	7 p.m.	11 p.m.
1868.					
Feby. 21	...	...	...	...	105° F.
" 22	...	101°.5 F.	104° F.	...	103°.6
" 23	102° F.	103°.2	...	105°.2 F.	102°.2
" 24	104°	103°.6	105°.4	104°.6	104°.2
" 25	102°.8	102°.4	104°.2	104°	103°
" 26	104°.2	101°.6	104°.1	104°	103°
" 27	102°.6	103°	104°.2	103°	104°.8
" 28	104°	102°.8	...	102°.4	103°.6
" 29	102°	102°.4	...	...	104°.4
March 1	103°	102°.6	100°.6	...	104°.8
" 2	102°.6	103°	...	...	104°.8
" 3	104°.4	103°.8	...	...	104°.4
" 4	...	102°.4	...	...	104°
" 5	103°.4	102°.8	...	...	104°.8
" 6	103°.8	102°	...	...	104°.2
" 7	103°.2	102°	...	...	...

SUMMARY.

Average of Observations.

3 a.m. (13 obs.), ...	103°.23 F. (39°.57 C.)
6 " (15 "), ...	102°.60 F. (39°.22 C.)
1 p m. (6 "), ...	103°.75 F. (39°.86 C.)
7 " (6 "), ...	103°.86 F. (39°.92 C.)
11 " (15 "), ...	104°.05 F. (40°.02 C.)
Highest temperature, ...	105°.4 F. (40°.77 C.)
Lowest temperature, ...	100°.6 F. (38°.11 C.)
Only thrice under, ...	102° F. (38°.88 C.)

Case VIII.

Mary Smith, aet. 7¾ years, admitted to ward, June 27, 1868. (Family history apparently good.) Has had a cough with pretty abundant expectoration for 5 or 6 months. Began 7 days before admission, with headache, languor, and vomiting. On admission, she was found to be much emaciated, and seemed extremely feeble and oppressed. The resonance of chest appeared to be lessened generally, with variable comparative dulness in different portions. Loud wheezing and creaking râles were heard all over. A few streaks of blood were seen in the sputa during the first week. Tongue clean; bowels regular; no diarrhœa, abdominal tenderness, "rose spots," or rash. Pulse 105–120. *Treatment* consisted in administering small doses of ipecacuan and morphia, and in applying poultices to the chest. Eggs and beef-tea were freely given, as also a few ounces of wine daily. When the chest symptoms moderated and cleared away, tonics and cod liver oil were substituted. Rapid improvement occurred, and before her dismissal, on August 22, the child was distinctly gaining flesh. (Although this child recovered, there is little doubt of the diagnosis, which was concurred in by other three medical men.)

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* Feby. 27th, 2½ p.m., 104·2 F. After tepid bath 102·2 F.
" 28th, 3½ " 102·2 F. " " 100.4 F.

Date.	Morning.		Evening.	
1868.	Hour.	Temperature.	Hour.	Temperature.
June 28, ...	11	103°.4 F.	11	104°.8 F.
" 29, ...	11	104°	10	104°
" 30, ...	9	103°.4	10	104°
July 1, ...	8	101°.1	10½	103°.5
" 2, ...	7	101°	9	103°
" 3, ...	8	101°.2	10	104°.5
" 4, ...	8½	100°.4	8	102°
" 5, ...	9	100°	9½	103°.5
" 6, ...	...	...	10	103°.4
" 7, ...	8½	100°	9½	103°
" 8, ...	8½	101°	9½	103°.2
" 9, ...	...	...	9½	101°.2
" 10, ...	...	...	9½	101°.2
" 11, ...	...	...	10½	100°.5
" 12, ...	...	...	10½	99°.5
" 13, ...	...	...	11	98°.2
" 14, ...	9	98°.6	10	98°
" 15, ...	9	99°	10	98°.1
" 16, ...	11	99°	10	98°
" 17, ...	8	99°	12	97°.4
" 18, ...	...	...	9½	97°.6
" 19, ...	9	98°.8	10	98°.3
" 20, ...	8	99°.1	10½	97°.8

SUMMARY.

From June 28 to July 3,	Average of morning,	102°.35 F.	(39°.08 C.)
	" evening,	103°.96 F.	(39°.97 C.)
From July 4 to July 8,	" morning,	100°.35 F.	(37°.97 C.)
	" evening,	103°.02 F.	(39°.45 C.)
From July 9 to July 13,	" "	100°.12 F.	(37°.84 C.)
From July 14 to July 20,	" morning,	98°.91 F.	(37°.17 C.)
	" evening,	97°.88 F.	(36°.6 C.)

I have submitted the foregoing observations with the figures given in full. This seems to me to be the only way of affording others a fair opportunity of comparing them, and of judging of their value and indications. Of their deficiencies, in point of number, and in other respects, I am perfectly conscious; but, so far as they profess to go, great care has been taken to ensure accuracy of observation and statement.

I. *The course of the temperature in phthisis and tuberculosis*, as announced at the beginning of this article, is found to be illustrated in several of its varieties by the cases adduced.

Type I. is illustrated by Cases I., II., and III. In these, the morning temperature averaged 99°.32 F. (37°.4 C.)

This is normal, or nearly so,* but the evening temperature is elevated.

Average difference between morning and evening temperature, ... in Case I., 2°.21 F. (1°.23 C.)
in Case II., 2°.50 F. (1°.39 C.)

In Case III., the evening elevation was very inconspicuous.

Case III., Average difference between morning and evening, in 1st series, ... 0°.11 F. (0°.6 C.)
in 2nd series (at different hours), 0°.59 F. (0°.33 C.)

Type II. is illustrated by Cases IV. and V.

The morning temperature averaged,
in Case IV., 100°.16 F. (37°.86 C.)
in Case V., 100°.67 F. (38°.15 C.)

This is a slight but distinct elevation above the normal standard. The evening temperature, however, overtopped these figures.

Excess of evening over morning temperature,
in Case IV., 3°.51 F. (1°.95 C.)
in Case V., 1°.41 F. (0°.78 C.)

Type III. is illustrated by Cases VI. and VII. In them the averages were—

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* The reader will please remember that all the figures here used refer to the temperature of the rectum; he might otherwise think that they were too high.

Case VI. Morning, 6 A.M., 102°. F. (38°.88 C.) Evening, 11 P.M., 102°.33 F. (39°.07 C.)

Case VII. Morning, 6 A.M., 102°.6 F. (39°.22 C.) Evening, 11 P.M., 104°.05 F. (40°.02 C.)

This shows an average rise in the evening temperature; but, on examining the particulars of the two tables, it will be found that the course from day to day showed much irregularity in this respect. It seems better, therefore, to regard such cases as falling under the 3rd type, which is characterized by constantly high temperatures, showing but little regular tendency to evening exacerbations.

Case VIII. exhibits a varied course. At first, there was a pretty high and constant elevation of the temperature, averaging for the morning 102°.35 F. (39°.08 C.), and, for evening, 103°.96 F. (39°.97 C.) To this succeeded a period of morning remissions, with large daily fluctuations, which amounted to 3°. F. (1°.66 C.) These became more moderate, and, after recovery (as I continued to take the observations for this purpose), the normal daily range was found to become established, so that the morning temperature averaged 98°.91 F. (37°.17 C.), while at night the average fell to 97°.88 F. (36°.60 C.)

The occurrence of collapse temperatures was noted once or twice in Case I. Temperatures from 97° to 97°.4 F. (36°.11 to 36°.33 C.) were recorded on four occasions, at different times of the day, in addition to the very low temperatures which continued throughout the two days immediately preceding death. The minimum reached was 95°.8 F. (35°.44 C.) about twenty hours before death occurred.

Case III. (second series of observations) is interesting, as showing that where the disease is slow in its course, and the fever slight in amount, there may be a tendency to the evening fall of temperature, which occurs in healthy children.

The average of 20 observations at 7 P.M. was 100°.24 F. (37°.91 C.)

The average of 22 observations at 10 P.M. was 99°.53 F. (37°.51 C.)

II. *Is there a "continued elevation of the temperature in all cases* *of tuberculosis?"* The morning temperature is allowed by all to be very frequently normal. In answering the question as to the evening temperature, we require to have some definite standard, to judge whether the elevation exists. If, speaking roughly, the usual figure, from 98° to 99° F. (36°.66 to 37°.22 C.), be taken as the normal standard, the question must be answered in the negative. Dr Hillier's statement already quoted,—many of the figures in the cases I have detailed,—and some even of Dr Ringer's observations (as already pointed out), show that children,—with undoubted tubercular disease, advancing, and even, perhaps, leading to death,—may have an evening temperature within the limits named. Indeed, as I have shown in Case III., (where the signs of phthisis were exquisitely marked), the evening temperature not unfrequently fell below the morning one.

III. *Is there always some departure from the strictly normal course of the temperature, in tubercular or phthisical children?* This is a question which, so far as I am aware, cannot at present be answered. In a former paper I pointed out, as the result of a somewhat extended inquiry, that in healthy children, a conspicuous diminution of the temperature occurs in the course of the evening; so that the morning temperature (7½ to 9 a.m.) averaged 99°.41 F. (37°.45 C.), and the evening temperature (9 to 12 p.m.) averaged 97°.50 F. (36°.38 C.) Making allowance for the different hours at which observations may be taken, and for the differences in individual children, we may fairly conclude that the evening temperature in health, should be, *at least*, 1° F. (0°.55 C.) lower than that normal to the morning. Now, it is interesting to find that in Case III.,—the one which approximates most closely to the normal temperature,—we get a distinct departure from this disposition of the range in health.

Case III. Morning temperature, 7½ to 10 a.m. Average of 52 observations, ... 99°.64 F. (37°.57 C.)

Evening temperature, 7 to 10 p.m. Average of 78 observations, ... 99°.84 F. (37°.68 C.)

Evening temperature, 7 to 9 p.m. Average of 56 observations, ... 99°.99 F. (37°.77 C.)

Lowest evening temperature, out of 78 observations, 98°.2 F. (36°.77 C.)

We thus perceive an average rise of the evening temperature, which, although very slight, acquires some significance, from its replacing the diminution natural to health.

In the other Cases (I., II., and IV. to VII.), although temperatures approaching the normal do occasionally occur in the evening, the lowest figure reached—and that only twice—is 98°.4 F. (36°.88 C.), provided we exclude the collapse temperatures in Case I., which are evidently of an exceptional character. This exceptional character is shown by the fact that, on the first occasion (July 24), they only continued for a few hours; and, on the subsequent occasion (August 15 and 16), they were the prelude of death.

Only in Case VIII., where the temperature was traced on to recovery, did it show the normal disposition.

Of course, many further observations would be required to prove that there is always even this slight departure from the normal course of the temperature in tubercular children; but, apart from any little practical value which such a discovery might have, it would be useful, in a scientific point of view, as saving from rather numerous exceptions, the important general rule, that phthisical children have an abnormally high evening temperature.

IV. *What is the value of the thermometer in the diagnosis of phthisis and tuberculosis in children?*

a. It gauges the fever. The importance of evening febricula, as a sign of tuberculosis, has been much insisted on by writers, long before they used the thermometer. This fever was judged of by the rate of the pulse, and by the hand of the physician applied to the skin. The pulse, however, in children is apt to be very unreliable, owing to trivial disturbance, or to mental excitement. If, therefore, the thermometer can indicate the degree of fever in a child, with as much accuracy as the pulse would do in a sleeping child, or in an unexcitable adult, we have much reason to be thankful for its assistance. (I believe that its indications, in this respect, are much more accurate than is implied in this statement, but I have limited myself to a proposition not likely to be disputed, even by those who estimate the instrument lightly.)

b. The typical course of tubercular fever,—more or less high evening temperatures, with morning remissions,—when it occurs instead of the typical course of other diseases (such as lobar pneumonia, measles, &c.), or when it occurs in the absence of other signs of disease, may often arouse suspicion and justify a diagnosis, before this would otherwise be possible. Of course, accurate and extensive observations in all affections, trivial as well as severe, would require to be carefully made and published, to prevent mistakes or undue apprehension from the occurrence of such a range of temperature. The resemblance of the course of the temperature in enteric and intermittent fever to that of tuberculosis, has already been noticed;—indications for the discrimination are given in the passage quoted from Wunderlich. It is worthy of remark that, although the course of enteric fever may be very much prolonged, still, the period of great daily fluctuations, which most resembles the tubercular temperature, occurs in the course of convalescence, and so is necessarily limited to a comparatively short time.

Other diseases,* however, may, perhaps, more or less simulate the tubercular temperature. Thus, in nephritis, a great daily range may occur, and, accordingly, this may sometimes be met with in the course of scarlatina;[*] renal and dropsical symptoms, however, are usually too obvious to allow of a mistake being made.

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* Thermometry can only be made useful by a full disclosure of difficulties, and of the source of fallacies. With this view, I append a note of a case of *chorea*, where the thermometer seemed to me to raise, unnecessarily, the idea of tuberculosis.

Alice Brough, aet. 9¼ years, admitted October 30, 1868, with a second attack of chorea, having had the same affection eight months before. Twitchings not severe. Treatment consisted in the use of douche baths, and of regulated movements. The choreic motions became trifling, but she was observed, a few days after admission, to be very languid and feverish. No explanation of this state could be obtained, although careful search was made for signs of disease in chest and abdomen. The baths were stopped, and the patient confined to bed. This state continued for about a fortnight, and then gradually disappeared. After this the child improved rapidly. There was no further reason to suspect tuberculosis. No doubt, like most choreic patients, she was a delicate child. Temperatures were taken in rectum from November 7th to November 28th. Two grain doses of quinine were given, and the effect on the temperature was tested once or twice; it seemed to be followed by a fall of the thermometer. This was the only treatment.

November 7th to 17th. Morning temperature, average of six observations, ... 99°.01 F. (37°.22 C.)

November 7th to 17th. Evening temperature, average of eleven observations, ... 103°.21 F. (39°.56 C.)

c. The absence of a strictly normal course of the evening temperature in tubercular children, *if this be corroborated*, may possibly, in rare circumstances, assist our diagnosis. Or, in cases where the evening remission of temperature usual to health is perfectly marked, we may, perhaps, be enabled to assert the absence or suspension of the tubercular process. Of course, if a child is at all ill, even to the most trifling extent, there is apt to be some elevation of the evening temperature; and I am too well aware that the temperature of children is affected by trivial disturbances,[†] to think that much assistance could often be derived from such an inconspicuous departure from the normal course.[‡]

After this the temperature declined rapidly, and from

November 25th to 28th, morning temperature averaged 98°.90 F. (37°.16 C.)

November 20th to 24th, evening temperature averaged 98°.56 F. (36°.97 C.)

The child was dismissed perfectly well.

In *another case of chorea*, a boy, aet. 10½ years, in whom the twitchings were not at all severe, there was, if not an elevation of the temperature, at least a diminution of the evening remission natural to health. The temperatures were taken in rectum, at 8 A.M and 8½ P.M., from August 5th to 17th, 1867.

Morning temperature, average of eleven observations, 99°.44 F. (7°.46 C.)

Evening temperature, average of thirteen observations, 98°.93 F. (37°.18 C.)

Is there not a degree of evening febricula in some cases of *syphilitic disease*, apart from superficial inflammations?

[*] See, for example, Case 29 of Dr Ringer's cases of scarlatina, *Medico-Chirurgical Transactions* for 1862.

[†] "Auch ist nicht zu übersehen, dass bei kleinen Kindern geringfügige Störungen ein Ansteigen der Temperatur bedingen können."—*Wunderlich*, Op. Cit., page 316.

[‡] The two following cases are submitted with a view of indicating my meaning, in reference to the possible value of the thermometer in such cases, not at all with the idea of proving the suggestion made in the text. My attention had not been directed to the subject at the date of the first case, otherwise I would have made an extended inquiry; indeed, I considered the evening temperatures at that time, as rather indicating the *absence* of tubercular disease in this case. A few scattered observations,

V. *The relationship of the temperature to the nature of tubercular disease* is a subject of profound interest and importance, but one which, as yet, rests in considerable obscurity. In view of the doctrines recently propounded as to the true nature and course of phthisis, it would be interesting to obtain some thermometrical information regarding the heat of the body at the time of the deposition of the tubercular granulations, before they had set up inflammation in the adjacent tissues. Some writers assert that, in this stage, there is no fever.* On the other hand, Dr Ringer seems to believe "that there is always an elevation of the temperature during the deposition of tubercle, and that the elevation is

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made under different circumstances, seem to me to tend in the same direction as the two following cases—

James Hampson, aet. 2½ years, admitted to ward, August 26th, 1867. There was strong reason to *suspect* mesenteric disease.

October 4th to 17th, 1867. Morning temperature, average of three observations, ... 98°.76 F. (37°.08 C.)

October 4th to 17th, 1867. Evening temperature, average of seven observations, ... 100°.02 F. (37°.78 C.)

After 4½ months' residence in ward, at last gaining flesh.

January 11th to 15th, 1868. Morning temperature, average of five observations, ... 98°.65 F. (37°.0 C.)

January 11th to 14th, 1868. Evening temperature, average of four observations, ... 97°.37 F. (36°.31 C.)

The next case affords a striking contrast.

Jane Motley, aet. 9¾ years; admitted to ward, December 4, 1867. There was a history of spine and hip-joint disease when 4 years old. Projection of two upper dorsal, and of fifth lumbar spines. Right buttock flattened. Chronic abscess in left gluteal region (for which she was admitted.) There was marked dulness of apex of right lung, with bronchial breathing. This, conjoined with evidence of caries, led to a very grave prognosis. The cough, however, was trifling, and soon disappeared; nor did any further lesion in the lung reveal itself, although the child was under observation at the dispensary for many months. The temperatures show a distinct evening fall, quite in accordance with the idea that no tubercular disease was then active.

December 5th to 16th, 1867. Morning temperature, average of eleven observations, ... 99°.36 F. (37°.42 C.)

December 5th to 16th, 1867. Evening temperature, average of ten observations, ... 98°.12 F. (36°.73 C.)

* *De la Phthisie Pulmonaire* par M. Hérard, et M. V. Cornil. Paris. 1867. Page 200 and *passim*. These gentlemen state confidently, that there is no fever in this stage of the disease, provided there be no complications. They do not say, however, that they have tested their opinion by the thermometer. Cases of slight tubercular hæmoptysis without other chest symptoms, especially if afterwards examined by dissection, seem the most favourable for this important inquiry.

proportionate to the activity of the deposition." (p. 17.) The facts, mentioned by Wunderlich, that the course of temperature in phthisis may resemble pretty closely that of broncho-pneumonia,* and that *phthisis without tubercles* (granulations), cannot be discriminated by the thermometer from *tubercular phthisis*, would seem to indicate that the typical elevation of the temperature in this disease may really be due to the character of the concurrent inflammation. This, of course, might be the case, even if the deposit of granulations were also attended by some degree of fever.

The whole question of the production and regulation of the animal heat, whether in health or disease, is far from being properly understood. That the production of heat is closely related to nutrition and respiration, can scarcely be doubted, but the regulation of its amount, would seem to be very much under nervous influence, and, perhaps, some law of periodicity. The fact of the occurrence of great emaciation in the course of phthisis, naturally associates itself in our minds, with the waste which a high temperature must almost necessarily produce. This loss of weight is usually more or less marked in all cases of fever, whether idiopathic or traumatic.† On the other hand, it is interesting to remember that cancer, although pre-eminently a wasting disease, is said not to be attended by any elevation of temperature, while, in diabetes, the emaciation would seem rather to be associated with a diminution of the animal heat.‡ It is with the view of discovering something of the hidden nature of disease, that thermometrical researches ought to be carried into every realm of physiology and pathology, even although their practical indications were very much less important than, happily, they are.

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* For a full statement of the temperature in this affection in childhood, see Ziemssen *Pleuritis und Pneumonie*, &c.

† See the elaborate researches of Dr R. Schneider; *Untersuchungen über das Körpergewicht während des Wundfiebers.* (*Archiv für Klinische Chirurgie, Bd. XI.*) Berlin, 1869.

‡ As to diabetes, see Dr B. W. Foster's note in *Journal of Anatomy and Physiology*. London. 1869. Page 377.—Cancer is usually stated to be attended by little or no elevation of the temperature. See *Wunderlich, Op. Cit., page* 379, and *Dr Ringer, Op. Cit., page* 33. I cannot refer, however, to any extended observations. In the case of a woman, aged 47, with cancer of uterus and ovary, who came under my own notice:—

Morning temperature, averaged in eight observations, 98°.47 F. (36°.92 C.) in vagina.

Evening temperature, averaged in seven observations, 98°.51 F. (36°.95 C.) in vagina.

II.—ON THE TREATMENT OF LACERATION OF THE PERINÆUM, IMMEDIATELY AFTER DELIVERY.

By JOHN BRUNTON, M.A., M.D., *Surgeon to the Royal Maternity Charity, London.*

LACERATION of the perinæum is an accident that happens in a certain proportion of first deliveries, in many cases due to want of attention on the part of the accoucheur, in not using sufficient retarding force to the protruding head, or in not preventing the mother from straining to an excessive degree; or from either of these causes singly. Nevertheless, there are many cases which are quite unavoidable. Let the care of the practitioner be ever so great, laceration more or less occurs.

If the laceration be up to the sphincter ani, but not through it, the amount of injury need not give the practitioner much concern, for the treatment of the injury is both simple and most successful. At the same time, it is better if such injury can be avoided, both for the practitioner's credit and self-comfort.

The laceration in the recent state looks much more formidable than it really is. The perineal structures having undergone a gradual process of stretching and unfolding, the rent appears to be two or more inches in length; but as retraction of the perineal tissues takes place, gradually, in a day or two, what before was an ugly wound, now is but a narrow sore, and all the treatment that is necessary is, from the first, to tie the mother's knees together, and pay strict attention to the cleanliness of the injured parts. I adopt the plan of expelling all clots from the uterus and tightly bandaging the mother, putting a compress over the uterus, for the purpose of keeping up its contraction, and thereby reducing the lochial discharge to a minimum, and having the vagina daily washed with a solution of Condy's disinfecting fluid. It is obviously necessary in so doing to use a syringe with a small tube, else the parts would be disturbed. It is also advisable to avoid purgative medicines for a week or so, and to give a light but nutritious diet, such a diet as will produce as little fæces as possible.

But there is another form of laceration which is much more serious, and one which, when badly healed, has got the credit of being the cause of a number of evils—barrenness, prolapse of uterus, fæcal incontinence, and so forth—a train of evils which makes life miserable to the sufferer, and calls for remedy at the hands of the surgeon at some time or other; necessitating an operation that is severe, requiring chloroform, and the greatest after attention—an operation, too, that very often is not at first successful, a second or a third being required. This form of laceration is fortunately but rarely met with, *i.e.*, in comparison with the former kind. The laceration in this case extends through the sphincter, and sometimes through a portion of the rectovaginal wall. When the rectum has been injured, and the parts have healed badly, it is common to find a rectovaginal fistula, which requires operative procedures for its after cure. This severe lesion is seldom met with as the result of natural straining during the second stage of labour. It is usually produced by the extraction of the head by the forceps, or by slipping of the forceps during extraction. In one of the cases narrated below, the forceps, being badly tempered, yielded during extractive pressure, slipped off instantaneously, tearing the perinæum through the sphincter. What conduces to tearing of the perinæum is the congested and, so to speak, sodden state of the parts due to long pressure of the head at the outlet; the perineal tissues lose their elasticity and tenacity, and tear with great ease. Sometimes the tear begins close to the sphincter, and proceeds forwards and backwards; at other times it follows the usual course, beginning at the fourchette.

Case I.—On the evening of September 27, 1866, I was summoned to attend Mrs P., a private patient. I found her in labour with her first child. She was 31 years of age, stout, pale, and of a generally flabby constitution. As labour had not advanced far, and the presentation was natural, I left, with instructions to send for me when required. Next morning I was sent for, and found labour progressing so far favourably: pains active. At noon the os was fully dilated, the waters had come away, and the head had descended to the outlet. Pains being still active, and the capacity of the pelvis being pretty fair above, though somewhat narrowed at the outlet, from approximation of the tuberosities of the ischia, I determined to wait for an hour or two. After waiting three hours, and there being little or no advance of the head, the caput succedaneum for two hours projecting slightly through the ostium vaginæ, and the perinæum becoming much congested; at the same time, the day being very hot and close, the mother getting very restless, tossing about, anxious, and desirous that her labour should be brought to a close, the labour pains, meanwhile, losing strength, and pulse rising to 120, I determined to extract the child by forceps, and sent for a medical friend to assist me. Without any difficulty I applied Dr Wilson's short straight forceps, and commenced extraction: the head gradually began to yield to the pressure and extractive force; and as I slowly brought the head down and out, I was much dismayed at seeing the perineal skin begin to split on the surface just anteriorly to the sphincter ani. Gradually as I gave the head the proper turn the tissues gave way, the perinæum splitting anteriorly through the fourchette and posteriorly through the sphincter. The child was born alive and hearty, and weighed about 11 pounds. After delivering the placenta and pressing all clots out of the uterus, bandaging firmly with the usual compress, I sent home for my pocket case, having made up my mind to treat the laceration at once. Having placed the mother on her left side in the usual obstetric position, with a curved needle I passed a silver suture deeply through the torn sphincter, drawing the wire up tight, then two more sutures (interrupted) anteriorly. No chloroform was given; the mother *did not complain at all at the passage of the needle.* The after treatment consisted in daily syringings of the vagina with a tepid solution of Condy's fluid, constipation of the bowels by means of opium pills, and rest in bed. On the seventh day I removed the sutures, and on the tenth an enema was administered, the bowels were opened, and after an examination of the parts which had been torn and sewn together, they were found to have united throughout, and the patient was allowed to get out of bed. The recovery after this was uninterrupted.

On the 5th December of the following year, I was sent for to attend the same mother, then in labour with her second child. The case was natural; I was permitted to examine the state of the formerly torn perinæum, as the head came down and out. I had the satisfaction of finding that the perinæum distended and the ostium vaginæ dilated admirably, that not the slightest tear took place; in fact, the cure had been so good that, had I not known the previous state of matters, I would never have supposed that there had been any former laceration.

CASE II.—Mrs R., aet. 23, from her youth had been accustomed to sit all day at the work of sewing boots, and after marriage, up to the day before her confinement, was so employed. When taken in labour with her first child, I made a careful examination of the capacity of her pelvis, and found that though wide above it was transversely and antero-posteriorly narrow at the outlet, being funnel shaped; the shape of her pelvis being like that of the boot workers of Nantwich, where, on account of the same cause, there is very often necessity for instrumental aid in the latter stage of labour. As she was the wife of one of the employees of the Great Northern Railway, I deemed it necessary to call in the consulting physician. The child's head was wedged at the outlet, just as in Case I. Medium-sized straight forceps were applied by Dr Davis, and after some difficulty the head began to yield. In this case the perinæum commenced to tear at the fourchette, and though I made two lateral notches about half an inch deep at each side of the posterior part of the tear, as the head was slowly extracted the laceration, uninfluenced by the incisions, went backwards through both sphincters and up a portion of the rectum. The child was large. I proceeded to sew up the rent in exactly the same way as in Case I. The patient complained of *no pain during the operation.* The after treatment was similar, and the cure as complete. On the 13th February, of the present year, I again delivered her—the child was smaller, labour easy, and, just as in the case above, the perinæum distended readily, and there was not the slightest trace of tearing.

The third case is the one already mentioned, where a friend of mine, while extracting the head by forceps, lacerated the perinæum, because the instrument, being badly tempered, yielded instantaneously, and was drawn out locked. The perinæum was torn backwards from the fourchette through the sphincter ani. The delivery was completed with other forceps. I stitched the lacerated perinæum. The mother did *not feel any pain* to speak of during the operation. I have not been able to ascertain the final result of this case, as my friend was called in during the absence of another practitioner, whose case it was.

I have narrated the cases simply as they occurred, and remark—

1st. That the result of the *recent* operations is very satisfactory.

2nd. That the operation is very easy.

3rd. That it is comparatively free from danger, and is nearly painless, requiring no chloroform, because the parts which have been torn are in an anesthetic state, being benumbed by the pressure they have recently undergone.

III.—NOTES ON THE SURGERY OF THE UPPER EXTREMITY.

By DAVID C. M'VAIL, L.F.P.S.G., *House Surgeon to Alnwick Infirmary.*

SURGICAL affections of the upper extremity are very common, and none cause more anxiety both to surgeon and patient. In no class of cases is it more desirable that all deformity be avoided, and that the parts be as soon as possible, and as completely as possible, restored to their normal condition. In furtherance of this object, the following observations are laid before the profession, on the treatment of fractures of the fore-arm, fracture of the humerus, and fracture of the clavicle; together with suggestions on the after treatment of excision of the elbow joint, and a few remarks on a rare feature in dislocation backwards at the elbow joint.

Fractures of the Fore-arm.—In such cases, the almost universal practice is to bandage the arm to a flat pistol-shaped splint. The entire unsuitableness of such treatment will be at once apparent to anyone, who will take the trouble of placing his own arm on a flat table, in the position occupied by the arm when on the flat pistol splint. It will be seen that the *ulna*, which has an almost perfectly straight contour, receives support at its olecranon end only; from this point downwards the bone gradually recedes from the flat surface, its distal end being fully five-eighths of an inch removed from it. It will be further seen that the *radius* never touches the flat surface at all, being at all points distant from it, from half an inch to an inch. Therefore, when either or both bones are fractured, and when the arm is bandaged firmly to the splint, the fractured ends are in danger of being dragged down from their normal position towards the flat surface; and should they unite in this position, the ulna will no longer be *straight*, but will be *curved*, its posterior aspect being concave, while the natural anterior concavity of the radius will be lessened or abolished—or, as in one case which came under my own observation, it may even present a convex aspect anteriorly. When any such mal-position ensues, the movements of pronation and supination are, of course, greatly impaired.

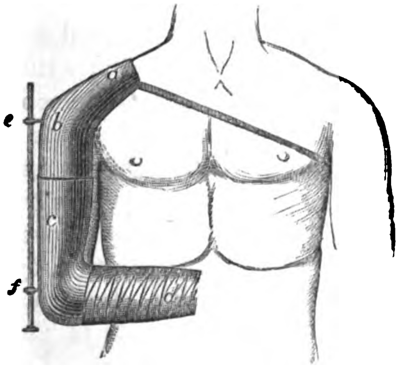
Another and much greater evil which may follow bandaging the arm in such a position is, that the radius, which for a great part of its length is at a much higher level than the ulna—that is, further removed from the flat surface—is very liable to be dragged down to the level of the ulna; and thus, when both bones are broken, osseous union may take place between them, when, as a necessary consequence, the pro-native and supinative movements will be altogether annihilated. And such an evil is not imaginary, for most surgical authorities caution against it, proposing as a means for preventing it, to place a long narrow pad between the two bones, a pad which never can be kept in position, and which, even when in the most accurate position, can have but very little influence in preventing union, as compared with any means which will keep the radius at its normally higher level.

To accomplish the object of keeping both radius and ulna in proper position when uniting, I have had a splint constructed which possesses all the advantages of the common pistol splint, the Gordon splint, and several other advantages besides. It consists of a part for the arm, and a part for the hand, the two parts moving on each other by means of a horizontal joint, just under the wrist joint, which can be fixed in any position by a finger-screw on the under surface of the splint. The part for the arm consists of a flat board, which in length, width, and thickness, is much the same as the straight part of the common pistol splint. On the upper surface of this board is glued an inclined plane of cork, for the support of the ulna, and on the inner half of this inclined plane another pad of cork is fixed, so shaped as to fit accurately the very considerable curve of the radius.

If the fractured arm be carefully fixed on this splint, the parts must be in accurate position; and if the bandage be kept moderately tight, it is impossible for any mal-position to occur. The part on which the hand rests is made to move horizontally at the wrist, and may be fixed in any position by the finger-screw, in order that as much or as little of the pistol shape as is desired may be obtained, for, as every one is aware, some cases require more, and some require less of this angular position.

This splint, which is really a very simple affair, only attempts to do effectually what is at present very ineffectually done by means of pads, which in almost all cases—especially where romping children are concerned—get into all sorts of strange positions, often doing more harm than good. The cork is merely a firm, unyielding, accurately-fitting pad, which cannot possibly get into a wrong position, and which must keep the bones in a right position. The country surgeon who sees his patient but rarely, will, by using such a splint, save himself much anxiety; any patient will have sufficient intelligence to keep the bandage moderately tight, and nothing more than this will ever be necessary.

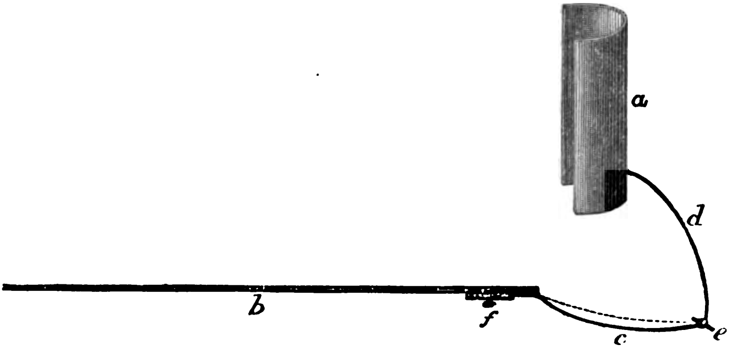
Fracture of the Humerus.—In a case which occurred some time ago in the out-door practice of the Alnwick Infirmary, there was some difficulty in preventing riding of the ends of the bone, and as the man was a martyr to chronic rheumatism, and while walking was constantly coming against the wall and surrounding objects, considerable doubt was felt as to whether the arm would ever regain its normal shape. It occurred to me that if the principle of the long splint, as applied to fracture of the femur, could be brought into operation here, all anxiety would for the future be avoided, as riding of the ends of the bone would be most effectually prevented. On mentioning this idea to Prof. Morton, of Glasgow, he approved of the theory, and stated that it was not new to him, as in one or two troublesome cases he had himself tried it, but found it did not answer well, as the projecting ends were in the way when the patient was in the recumbent position. Since talking with him, I have had a splint constructed which has the action of the long splint, and which never can be in the way.



It consists of a sheet of bent tin, which is fitted on the outer aspect of the arm and fore-arm, from the top of the shoulder down to the hand. But it is composed not of one piece but of two pieces, *a b* and *c d;* the piece *c d* overlapping the piece *a b* on the outer aspect of the upper arm, and connected with it so as to allow of a sliding movement up and down, the screw *e f* regulating and fixing the relative position of the two parts of the splint. It is applied in the following manner. First of all, the upper part of it is fixed to the shoulder by means of bands passing under both axillæ. The fore-arm is then fixed to the lower and horizontal part of the splint by bandaging. It is now self-evident that by working the screw we get the action of the long splint, and that thus we can prevent the tendency to riding and to shortening. Having regulated the parts to our satisfaction, we bandage the upper arm to the splint. And now let the patient do as he will, he cannot possibly get the parts out of position, and however oblique the fracture may have been, the ends will be kept in accurate opposition to each other.

Fracture of the Clavicle internal to the ligaments by which this bone is connected with the scapula, has always been one of the greatest difficulties with which the surgeon has had to contend. The shoulder is drawn with great muscular power forwards and inwards, and the weight of the arm causes in addition considerable depression, so that the fractured extremity of the scapular part of the clavicle occupies a position considerably behind and below the fractured extremity of the sternal part of the bone. The methods of treatment commonly adopted are, first, Desault's plan, which consists of a pad in the axilla, and a deal of bandaging to elevate the shoulder and keep the arm by the side. But as Syme observes, "when the cushion in the axilla is secured so high and so firmly as really to serve the office of a fulcrum, it compresses the nerves and blood-vessels beyond endurance, and if it be allowed to descend so as not to do this, it increases the distortion, by separating the arm from the side." The other plan usually followed is that proposed by Syme, and consists in "bracing back the shoulders by a figure of 8 bandage, or shoulder straps drawn together by any simple contrivance," and in supporting the weight of the arm with a suitable sling or bandage. Now this method very frequently fails to reduce the malposition of the outer fragment of the bone, because the shoulder straps act at a great mechanical disadvantage. If any one will grasp the shoulder of a person who has sustained this injury, in the same position as the shoulder strap grasps it, he will experience very great difficulty in reducing the mal-position, and in keeping it reduced, and from the great amount of force required to do so, he will at once become sensible that any bandage will yield to such a strain, and so allow the bone to get into its wrong position again, and besides, the severe pressure of the shoulder strap must be extremely annoying to the patient. But if the shoulder be grasped at its outer aspect, just over the acromion, and if it be drawn backwards and downwards, a very small amount of force is required to reduce the malposition, the fractured end of the bone being tilted upwards and outwards to its normal position. In a case which occurred in the out-door practice of the Alnwick Infirmary, I took advantage of this circumstance. I had a bandage two inches wide spread with adhesive plaster for two inches at one end, and this plastered part I fixed to the outer aspect of the shoulder just at the acromion. The bandage was then drawn diagonally downwards and across the back, and fixed to a transverse band running round the body, which was retained in position by perineal bands; but probably a better method would have been to have fixed this end to the body with plaster also. I likewise supported the weight of the arm in a bag hung from the opposite shoulder. In this case all deformity was avoided, and no one examining the clavicle now would ever dream that it had been broken, and yet broken it was, and that too just at the junction of the two curves. A bandage or strap so attached to the shoulder acts at the greatest possible mechanical advantage, and there is but little force required to keep the parts in position,—consequently, the strain on the bandage is so small, that, if of good quality, it will not yield in the least. I should like this method of treating fractured clavicle fairly put to the test by those who have the opportunity of doing so.

After-treatment of Excision of the Elbow-joint.—When a student at the Glasgow Royal Infirmary, the method which I saw invariably adopted was to place the arm after operation on a common rectangular splint. Such a splint seems to me objectionable for two reasons: first,—whenever the arm requires dressing, it has to be removed from the splint by an assistant and held by him while the old dressings are taken off and the new ones put on, a proceeding tedious and troublesome to the surgeon, and extremely painful to the patient. The other and more potent objection is, that as the arm always occupies the same position, adhesion more or less firm always takes place between the bones, before the wound is sufficiently healed to allow of passive motion being brought into play. Consequently, when the time does come for passive motion, great difficulty is experienced in overcoming the adhesions, and great pain and annoyance are given to the patient; and from the great force required to break up the adhesions, there is a considerable degree of risk run of setting up inflammation in a part so recently the seat of morbid action.



I have contrived a splint in which these two objections are altogether obviated. The upper arm is bandaged to the part *a*, the fore-arm to the part *b*; the parts *a* and *b* being connected together by the bent wire *c d*. The elbow-joint lies in the gap between the parts *a* and *b*, and the wound can of course be dressed as often as is desired without taking the arm off the splint at all. In the centre of the wire is a joint *e*, which may be fixed in any position by the finger-screw. This joint allows of any amount of *flexion and extension.* The end of the wire which comes to the part of the splint to which the fore-arm is bandaged is not fixed directly to the splint, but enters the tube *f*, and is fixed in any position by the finger-screw. This arrangement provides for the movements of *pronation and supination.* By giving the splint a slightly different position by slackening and retightening the finger-screws every time the arm is dressed, no adhesions will be allowed to form, and as the arm heals, the surgeon will of course increase the daily amount of passive motion. By the use of this splint, the arm will never require to be disturbed from the time when it is put on immediately after the operation, until the wound is entirly healed, and the movements of flexion and extension, and pronation and supination, are fully restored to the limb. Thus will the surgeon be saved a vast amount of anxious labour, and the patient a vast amount of pain.

Rare Feature in Dislocation backwards at the Elbow-joint.—A considerable time ago a person with dislocation backwards of the elbow-joint, of six weeks' duration, came to the Alnwick Infirmary in quest of relief. From the difficulty of the case, one's thoughts were of course somewhat closely bent on this particular form of dislocation. I found that all the surgical authorities which I had the opportunity of consulting were at one as to the position of the fore-arm in this dislocation. All of them state that it occupies the *flexed* position. Now it occurred to me that a very slight modification of the injury would cause the arm to take not a flexed position, but a position of the most *extreme extension.* The modification which seemed to me certain to produce the extended position of the fore-arm, is slipping of the tendon of the *biceps* muscle over the external condyle of the humerus, and as in a large number of the cases of dislocation backwards of the radius and ulna, there is also more or less dislocation outwards, I thought it quite wonderful that it should happen so rarely that authors take no notice of it. I suppose the rarity of its occurrence must be owing to the strong slip which is given off from the inner side of the tendon to the fascia on the internal aspect of the arm; but still, considering that the violence producing dislocation is sufficient to rupture the very strong ligaments of the joint, it certainly is strange that this little tendinous slip should give way so rarely. At this time I talked the matter over with Mr Fender, the senior surgeon to Alnwick Infirmary, and he admitted the feasibility of the notion, but had never seen it exemplified in practice. But strangely enough, in about two months afterwards such a case actually occurred, and was well reported in the *Lancet* of May 23rd, 1868, by Dr Helm, of Rugby. He says: "A——, on Feb. 22nd, 1867, fell when jumping, and injured his right arm. Thinks he has broken it. When I saw him he was lying on a bed, the arm being extended on a pillow, with the hand pronated, and the forearm extended on the humerus *beyond* the straight line so as to produce a bowed appearance. . . . The upper arm looked of a natural length and form when viewed anteriorly, but very short and deformed when viewed from behind. . . . The outer condyle could not be felt, though its position could, of course, be inferred from that of the internal condyle, which was very distinct. The olecranon must have been quite two inches higher up the arm than is natural in the state of extension. There did not appear to be any separation of the bones of the forearm. . . . There was very little swelling of the soft parts, and I was unable to detect any fracture, though the reduction of the dislocation, easily accomplished over my knee, by reason of the faintness of the patient, was attended by a very disagreeable grating sound, unlike what is heard in the reduction of most dislocations." The view of the case taken by Dr Helm, is that the extraordinary amount of dislocation allowed the triceps muscle to act with extraordinary force —force sufficient to draw the coronoid process such a distance up the shaft of the humerus, that it was above the level of the olecranon fossa, and then the flexor muscles permitting, this process rested against the posterior and inner aspect of the humerus, and thus the amount of extension was the index of the extent of the dislocation. This explanation, however, cannot be the right one, for I had a case some time ago in which the amount of dislocation was at least as great as Dr Helm says it was in his case—namely, two inches, so that, according to Dr Helm, there ought to have been very considerable extension in my case, which there was not, the arm being in the usual flexed position. But mere reasoning will show that the position cannot be thus accounted for. Every one knows that, as a general rule, the flexor muscles of any joint are more powerful than the extensor muscles; it is so with the knee, the ankle, the wrist, and the elbow. And every one further knows, that by approximating the two ends of a muscle and so relaxing its fibres, the action of the muscle is greatly lessened, provided always the mechanical advantage remains the same; consequently the triceps muscle, being an extensor, cannot, under ordinary circumstances, compete with the flexors, still less can it do so when the ends are approximated by two inches, as in Dr Helm's case, and in addition the mechanical advantage must have been greatly lessened. The difficulty cannot, therefore, be explained in this way; but if the most powerful of all the flexors—the biceps—comes to the assistance of the triceps—and this it must do whenever its tendon slips over the condyle—then it is at once clear that the arm cannot be flexed, but *must* be extended to the very utmost. Dr Helm speaks of a peculiar grating sound during the reduction of the dislocation; this is just what one might expect when the tendon of the biceps was being forced round the condyle into its original position, and is a still further proof of my view of the case.

I am very curious to know whether any of the readers of the *Glasgow Medical Journal* have ever met with any such cases, and what opinion they formed as to the cause of the extended position of the arm.

IV.—A VISIT TO SOME OF THE GERMAN SPAS.

By Dr M'Call Anderson, *Professor of Practice of Medicine in Anderson's University; Physician to the Glasgow Royal Infirmary.*

IV.—MARIENBAD.

We pass naturally from a study of the virtues of the waters of Carlsbad to those of Marienbad, seeing that they are very similar in nature, and that the two places are situated in the same district. The latter is five hours' drive from Carlsbad, and the journey is an exceedingly pleasant one—the scenery being all that could be wished. Marienbad, which, with its waters, belongs to the Convent of Tepl, is surrounded, except towards the south, where the view is extensive, with pine clad hills, which, however, are not so steep as those at Carlsbad. The broad valley in which it lies is very tastefully laid out, and it is almost exclusively composed of hotels and lodging houses. It is only within the last sixty years that the virtues of the waters have become extensively known. Up to this time it was difficult of access, and yet even then "numerous persons visited the spring in summer, and found relief from their ailments by the use of the water; leaving marks of the benefit obtained, by writing with chalk, pencil, or charcoal, on the wooden boards, their names and diseases, with the quantities of water drunk; sometimes even the number of the evacuations was noted down, for the edification of the curious."

The season extends from May to August inclusive—being therefore shorter than at Carlsbad—and for this reason, that the place is more elevated, being nearly two thousand feet above the level of the North Sea, and proportionately colder; but, if the coldness of the climate forms no objection, there is no reason why patients may not be benefited by visiting the Spa at any season. The waters are usually drunk in the morning before breakfast, between the hours of six and eight a.m., at which time the band plays; but sometimes they are taken also during the day, although in less quantity. It is hardly necessary to remark that it is very unsafe to drink them except under the eye of a physician. It is right that we should acknowledge, in this place, the courtesy of Drs Herzig, Sen. and Jun., two of the leading physicians, and the trouble which they took in visiting along with us, and in explaining to us the merits of the various springs.

The waters for which Marienbad is most celebrated are alkali-saline: there are three springs answering this description—the Kreuzbrunnen, which is in the centre of the town; the Ferdinandsbrunnen, a little way out of the town; and the Waldquelle, at its outskirts. They have pretty much the same composition as the Carlsbad alkali-saline waters; but they contain more sulphate of soda (Glauber's salts) and are therefore more decidedly purgative; more carbonic acid and iron, and are quite cold. Of the three, the Waldquelle is decidedly the weakest, containing, as it does, twenty-two grains of solids in sixteen ounces, but it is the richest in carbonic acid, and is accordingly very pleasant to the taste; the Ferdinandsbrunnen is stronger, containing forty-five grains of solids; while the Kreuzbrunnen is the strongest of all, containing sixty-six grains, and is the richest both in Glauber's salts and in iron. If the patient has a tendency to congestion of the head, it is advisable to warm some of the water, and then to allow it to stand for a few minutes before it is taken, by which process much of the carbonic acid is evolved, and it is proportionately less exciting.

The following is the analysis of the Kreuzbrunnen:—

Sulphate of soda (double the quantity in comparison with Carlsbad), -	38.11	grains.
Chloride of sodium (not quite double),	13.56	"
Carbonate of soda, - - -	7.13	"
" lime, - - -	3.93	"
" magnesia, - - -	2.71	"
" iron (only 0.02 of gr. in Carlsbad), - -	0.17	"
" manganese, - -	0.03	"
" lithia, - - -	0.11	"
Silex, - - - - - -	0.38	"
	66.13	grains, in 16 ounces.
Carbonic acid gas, - - -	8⅓	cubic inches.—*Sutro*.

These waters are of use in pretty much the same diseases as the Carlsbad waters, but the latter are preferred where there is a tendency to diarrhœa; they seem also more certainly efficacious in the treatment of hepatic disorders, especially in cases of gall-stones, and also, in virtue of their containing more carbonate of soda and lime, in cases of lithiasis and the like. On the other hand, the Marienbad waters are selected in cases of abdominal plethora, or of constipation, or when the bowels are irregular; hence, they are specially useful in persons of sedentary habits, who live freely, and whose bowels are constipated. Should the waters fail to move the bowels, the desired effect may sometimes be obtained by heating them before they are administered, and also by employing them in the form of injection; but in no case should excessive purgation be allowed. The iron and carbonic acid which they contain serve to counteract the depressing effect of the waters; but these ingredients are disadvantageous in persons with a tendency to congestion of the head.

As at Carlsbad, the waters of the Kreuzbrunnen and Ferdinandsbrunnen, especially the latter, are evaporated, and a Marienbad salt is obtained, in the form of large crystals which, however, in process of time, absorb water, loose their crystalline form, and become pulverulent. Like the Carlsbad salt, it is principally composed of Glauber's salt, the other ingredients being present in trifling quantity. All the three waters, as well as the salt, are exported in very large quantity, especially those of the Ferdinandsbrunnen and Kreuzbrunnen, and they keep well. Those, however, who take them at home must walk gently (not smartly, if action of the bowels is desired, else they act on the skin), for about an hour thereafter, otherwise the carbonic acid is apt to induce headache and such like symptoms.

Besides the above, there are two springs rich in iron and carbonic acid, and very pleasant to drink, and which also contain the ingredients of the other springs in small quantity, to the extent, that is to say, of from ten to fourteen grains in sixteen ounces: these are the Ambrosius and Karolinenquelle, of which the former is preferred, because the sulphuretted hydrogen which the latter contains renders it less palatable. They are useful in all cases in which iron is indicated; they are not exported, however, for many other iron waters are superior to them, but they are valuable adjuncts to the alkali-saline waters on the spot, and are often taken after a course of them. A mixture of the waters of Ferdinandsbrunnen and Ambrosiusbrunnen is very similar in composition and properties to the Franzensbad waters.

There is yet another spring, the Marienbrunnen, whose chief ingredient is carbonic acid, to such an extent, indeed, that a candle is extinguished when it approaches within two feet of the surface of the water, and a soap bubble, as we were shown by Dr Herzig, floats at about the same height. "The layer of gas spread over the surface of the water is highest before sunrise, lowest at noon, and then increases again towards the evening. It expands in rainy weather, and decreases when the sky is serene. In a very humid state of the atmosphere, the gas reaches as far as the upper boarding, (5½ feet above the level of the water.")*

These waters are used for baths, and combine the effects of common water and gas baths. The baths are usually taken along with a course of one of the other waters, and at a temperature of about 90° Fahr. On entering the bath a sense of chilliness is experienced, which is soon followed, however, by a glow of warmth, which is most perceptible in diseased parts; the surface of the body, too, becomes covered with innumerable gas bubbles. The baths have a stimulating effect upon the skin, and upon the system generally; they tend to diminish internal congestions, and render the patients more cheerful and happy.

The gas baths are very little used. The gas is composed of carbonic acid and a little sulphuretted hydrogen, the smell of which is distinct. They can be taken without trouble, it being unnecessary to undress. The patient steps into the bath, which is like a common water bath, and sits upon a seat, which is perforated with holes, through which the gas escapes, the head, of course, being above the level of the gas, and although it comes from a dry spring beneath, and is of the same temperature as the air, in a few minutes a most agreeable sensation of warmth diffuses itself over the body. They may be used for purposes of exhilaration, and to tranquillize the nervous system, but they are dangerous if there is any tendency to vascular congestion.

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* *Sutro.*

Lastly, the mud baths, which are quite a feature of the place, are now prepared from a new kind of earth discovered in the neighbourhood, which contains a considerable amount of saline matter, and is peculiarly rich in the salts of iron, (Dr Herzig, Jun., affirms that there is from seven to ten pounds in one mud bath.) This, however, is not of much importance, seeing that the iron is little if at all absorbed. They are principally of use as cataplasms in the treatment of painful affections, for, the mud being a bad conductor of heat, they can be used at a higher temperature than water baths. After eight or ten the skin becomes so irritated that an artificial eczema is produced, and this counter-irritation is sometimes of service. Otherwise their action is similar to that of the plain mineral water baths.

V.—THE FORCES WHICH CARRY ON THE CIRCULATION OF THE BLOOD.

By ANDREW BUCHANAN, M.D., *Professor of Physiology in the University of Glasgow.*

PART I.—THE FORCE OF THE HEART, EFFECTIVE AND ABSOLUTE.*

BORELLI estimated the force of the heart at 180,000 lbs., Tabor at 150 lbs., Hales at 51 lbs., Jurin at 15 lbs., and Kiel at 5 oz. These discordant estimates formed by men of eminence brought discredit on mathematical reasoning, as applied to explain the action of living organs. The attempt to determine the mechanical force of the heart has ever since been tacitly abandoned by most physiologists, who have regarded it as a problem which there was more wisdom in passing over than in attempting to resolve. Thus Magendie, after pointing out the extreme estimates of Kiel and Borelli given above, contents himself with exclaiming, "Where shall we find the truth amid such contradictions!" This is tantamount to declaring the problem to be beyond the reach of the human faculties. Nothing, however, can be more inconsistent with the views which are entertained at the present day, as to the fundamental principles of physiology—the true nature of which Magendie himself had so large a share in establishing.* Physics and Chemistry are now regarded as the foundation of Physiology, except in so far as it rests upon Psychology. But if the most recondite principles of the two former sciences are without hesitation referred to in the explanation of physiological phenomena, surely the most simple of all physical principles—the principles of Mechanics, cannot be regarded as having no legitimate place in physiological discussions. Neither is it true that there is a greater discrepancy of opinion in the mechanical than in many other departments of Physiology. It is simply, that in the former department an inexorable system of reasoning makes the slightest discrepancy conspicuous; every principle assumed, and every argument founded on it, having a precise value assigned to it, and the conclusions being rigorously deduced from the premises; while in too many of the other departments such discrepancies are lost sight of amid vague generalities, ill-weighed arguments, and unwarranted conclusions.

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* Part I. of Dr Buchanan's paper has already been printed and circulated to a limited extent as a pamphlet. We reprint it, preliminary to the appearance of Parts II. and III. for the first time in our pages.—ED. COM.

It cannot, therefore, be reasonably maintained, that the labour and ingenuity bestowed by the physiologists of the last century in measuring the force of the heart have been expended in vain; and that it is no duty of the physiologists of the present day to recognise gratefully, and form a fair estimate of those labours, while they join their own efforts to those of their predecessors to attain the end in view; never, however, forgetting that the task is one of ascertained difficulty; that much caution and circumspection are necessary in applying the simple principles of Mechanics to the complex actions of living organs; and that to presume to differ from Harvey, or Hales, or Borelli, is to contend on their own field with the giants and demigods of a bygone age.

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* "*Phenomènes Physiques de la Vie.*" Par M. Magendie, Paris, 1842.

A single preliminary remark may be useful with respect to the mode of reasoning adopted when we apply mathematical principles to Physiology. As all physiological phenomena vary according to age, sex, and constitution; and many of them also in each individual, according to various contingent circumstances influencing at different periods both body and mind; it may at first sight appear impossible to reason accurately with respect to them. Now it is quite true that the reasoning never can apply accurately to every case, nor to any one case at all seasons; but it may, nevertheless, represent quite accurately what occurs in them all within certain limits. This is done by means of average numbers. But when we reason from average and not from absolute numbers, the ultimate conclusion applies only in any individual case according as the average numbers assumed correspond more or less exactly with the actual numbers in the case referred to. The average numbers are worthy of complete reliance when they are deduced from a large number of exact observations. Such in every society where accurate records of births and deaths are kept, are the mortuary numbers applicable to the whole community, or to persons of either sex, or of whatever age; such numbers having been shown by experience to form a secure basis for the vast pecuniary transactions contingent on the duration of human life. But such numbers cannot be obtained with respect to many physiological phenomena which do not admit of being subjected to exact observations. In all such cases much judgment is requisite to select numbers which are certainly within the range of what actually occurs, and probably not far from the true average; and as minute accuracy is unattainable, a simple number, forming a convenient co-efficient in the computations into which it enters, is to be preferred to a complex number of doubtful certainty. Thus the duration of the systole of the heart was held by the physiologists of last century to be one-third of the period from one pulse to another, or of a complete cardiac revolution. Some modern physiologists, aided by the increased facility of observation which the stethoscope supplies, have preferred the proportion of two-fifths of the whole period, which is just one-fifteenth longer than one-third. As the difference is very minute, when the whole period is no more than five-sixths of a second, and as it is impossible to have much reliance on the observations by which so minute a difference is established, either proportion may be taken—the former having the preference for the most part when the number of the pulse is not defined; but the latter being sometimes preferable, as for instance, in giving the time of the systole at exactly one-third of a second, when the pulse is seventy-two.

The distinction between the effective and the absolute force of the heart, although hitherto neglected, is of primary importance in this inquiry. To estimate the force of the heart appears, at first sight, a single problem which can admit of only one satisfactory solution. But there are, in reality, two problems included in the estimate, and one cause of the discrepancy in the estimates that have been made is, that they are answers to different questions which require to be resolved on totally different principles. Thus Kiel seeks to determine the effective force of the heart; Hales and Borelli its absolute force. The distinction between them is the same as that which is familiar in mechanical science between the weight to be raised and the power which raises it. In general, one of these is given, and the other requires to be deduced from it on mechanical principles. But in the present case neither of them is given, and both are necessary subjects of inquiry to understand the action of the heart. The effective force which corresponds to the *weight* must be determined on separate grounds, that is without a knowledge of the *power* or absolute force exerted by the heart; and when the effective force is once determined, the absolute force is deduced from it as a result of the heart's mechanism. It depends entirely on that mechanism what must be the relation of these two forces to each other. In such an instrument as the common balance the two forces are equal to each other; in levers of the first and second kinds the absolute is less than the effective force, while in a lever of the third kind that arrangement is reversed. In the movement of the bones whenever the resistance to be overcome is of moderate amount, nature is profuse in the expenditure of muscular power, which she sacrifices freely to extent and facility of motion, and to the symmetry of the muscular parts. This tendency is clearly evinced by three different mechanical arrangements of frequent occurrence in the bodies of all animals—the adoption of the third kind of lever, almost to the exclusion of the other two; the oblique insertion of the muscles into the bones; and the oblique insertion of the muscular fibres into their tendons. When, again, as in moving the whole body, a great resistance has to be overcome, nature alters her mechanical arrangements, and is wisely parsimonious in the expenditure of muscular force. It remains to be seen how she regulates the never-ceasing action of the heart in distributing the blood over the body.

We have first, then, to estimate the effective force of the heart, which is determined by the mass of blood to be moved, the velocity with which it moves, and the obstacles which oppose its progress. More particularly we must know beforehand—1st. In what quantity, and with what velocity the blood issues from the left ventricle of the heart;—2d. What is the amount of the resistances or obstacles which oppose the movement of the blood;—and possibly, also 3d. Whether there are any auxiliary forces which assist in overcoming those obstacles and propelling the blood; but we shall see that this last consideration may be omitted by a peculiar mode of treating the problem.

The velocity with which the blood issues from the heart could be at once determined, if we knew the exact quantity of blood which the left ventricle discharges at each contraction; the number of contractions in a given time; and the size of the cardiac orifice of the aorta: for whatever length of an aortic tube of the same area as the cardiac orifice, the blood discharged in any given time, as in a minute, would exactly fill, the same is the measure of the velocity of the blood in a minute, or the space which the blood would pass over if it continued its motion for a minute with the same velocity with which it issued from the heart: the tube being always full, and being, although contractile, on the average of the size assigned to it.

The average arterial pulse, which is the same as the number of contractions of the heart per minute, is usually estimated at 72; and the area of the aortic orifice has been very generally taken according to Kiel's measurement as ·4187 of a square inch. The range of the probable estimates that have been made of the quantity of blood emitted at each contraction, by the left ventricle of the heart in an adult, is from 1 to 4 ozs. I assume 2 ozs., the estimate of Harvey, as certainly within the limits of what actually occurs, and probably not far from the average. Combining these elements, we have 144 ozs. of blood per minute expelled from the left ventricle of the heart. Now, 144 ozs. of blood are in volume 237·6641 cubic inches, and would fill of a tube ·4187 square inch in area, a length of 47·30195 feet. This, therefore, is the velocity per minute of the blood issuing from the heart. The estimate of Kiel is 52 feet per minute, and that of Hales is 49⅔. I assume, therefore, 50 feet per minute, or 10 inches per second, as a convenient number, certainly within the limits of truth, to denote the velocity of the blood as it issues from the left ventricle of the heart.

We have experimental evidence in confirmation of these estimates. The researches of Hering, made by injecting chemical substances, easy of detection, into the blood-vessels of living animals, and noting the time when they could be detected in blood drawn afterwards, at distant parts of the sanguiferous circuit, show at least that the assumed velocity is not too high; while the experiments of Volkmann and of Vierordt, made with instruments fitted to measure directly the velocity of the current of blood, show that in the carotid of the dog the blood moves very nearly at the rate indicated above.

The second element which requires to be taken into account in estimating the force of the heart, is the obstacles which the blood meets with as it passes along the sanguiferous circuit. After raising the aortic valves, it passes along a series of elastic tubes diverging from each other at various angles, gradually diminishing in size, and becoming more tortuous in their course as they diminish, till it arrives at the capillary system of vessels destined for the nourishment of the various tissues of the body, where it has to force its way through a network of canals so minute that in many of them not more than a single blood-corpuscle can pass at a time. From these canals the blood passes into the veins —a more capacious and distensible system of vessels, which bring it back to the heart. From this brief description it is easy to perceive the nature and magnitude of the obstacles which oppose the progress of the blood. It is useless to attempt to analyze them more minutely, as we are altogether unable to estimate the effect of any one of them, much less to determine in that way their total amount. The problem must, therefore, have remained for ever insoluble but for the ingenious experiments of the Rev. Mr Hales,* who has taught us how to estimate the total amount of the resistances to the movement of the blood, as it issues from the heart, without reference to any of them singly. This method, also, is attended with a still further simplification, inasmuch as it enables us to dispense with all consideration of the auxiliary forces that promote the circulation of the blood. The only two notable auxiliary forces which we recognize below act, one of them in augmenting the resistance, the other in signally diminishing it; but without specifying either, the effect of both is taken into account in the experimental results of Hales.

The well-known experiments of Hales were made by inserting a tube into the carotid or crural arteries of various animals—the horse, the doe, the sheep, and the dog—and noting the height to which the blood rose in the tube, from the tension of the blood-vessels. He found in the horse the height of the column of blood to be from 8 feet 3 inches to 9 feet 8 inches; in the sheep, 6 feet 5½ inches; and in 20 different dogs, it was generally 5 feet. He therefore assumes 7½ feet, or 90 inches, a mean number between those just stated, as the height to which the column of blood would rise in the human arteries. As frequent reference will be made hereafter to this column, I shall speak of it, for the sake of brevity, as the "hæmastatic column" of Hales. The more recent experiments of Poiseuille confirm remarkably the results obtained by Hales. He has also shown that the height of the column of blood is the same in all the large arteries of the body.

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* HÆMASTATICKS, being Vol. II. of "*Statical Essays*," by Stephen Hales, B.D., F.R.S. London, 1738.

It is only with the height of the column of blood in the arteries that we have at present to do; but as the height of the column in the veins has an important bearing on the second part of our subject, I subjoin a Table, gleaned from the work of Hales, exhibiting the relative heights of the hæmastatic column in the arteries and the jugular vein of different animals, and showing that the latter is just one-tenth of the former.

	CAROTID.	JUGULAR.
	Inches.	*Inches.*
Horse, - - -	100	12
Sheep, - - -	75	5·5
Dog, - - -	60	6
	235	23·5
Man, - - -	90	9

To apply the experiments of Hales to determine the amount of the obstacles which oppose themselves to the force of the left ventricle of the heart.

The semilunar valves at the root of the aorta are kept fast shut by the weight of a column of blood 90 inches in height, and ·4187 of a square inch in area; which is equal to

9,989·0370 *grs.*, or 23¾ *ozs.*, 35·912 *grs.*

Suppose then a glass tube to be constructed of the form of the letter U, and ·4187 of an inch in area, one of the arms of the tube (A, Fig. 1) being 90 inches in height, while the other, H, is more than an inch higher; and let a valve opening, from H to A, be placed in the middle of the transverse part of the tube. If now the branch of the tube, A, be filled with any liquid, the valve will be kept fast by the weight of a column of liquid 90 inches in height. Next pour liquid into the branch H, and the closure of the valve will become less and less firm as you pour, till at length, when the liquid stands at the same level in both arms of the tube, the pressure on both sides of the valve will be equal. The resistance of the valve is thus exactly overcome, and whatever additional quantity of liquid be poured into the branch, H, it will at once force open the valve, and keep it open till an equal quantity of liquid overflows from the top of the branch, A, and the equilibrium is again re-established,

Fig I

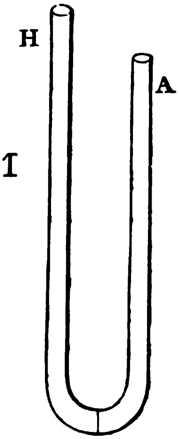
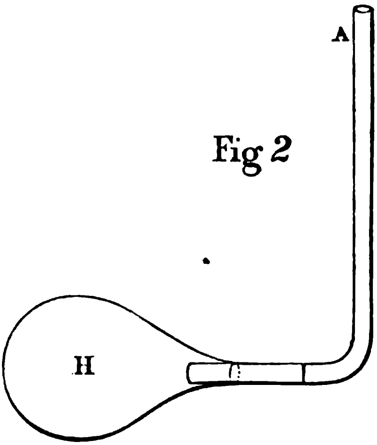


Fig 2



It is scarcely necessary to point out that if in place of the branch of the tube, H, we substitute a compressible flask (H, Fig. 2), filled with liquid, then the force employed in compressing the flask must be capable of overcoming the same resistance as the column of liquid in the branch, (H, Fig. 1). It certainly by no means follows that the actual force put forth by the hand in compressing the flask, shall be exactly equal to the effect it produces, or the resistance overcome; for that is a question dependent on the mechanism through which the force is communicated.

Exactly the same holds of the left ventricle of the heart itself, which, whenever it sends blood into the aorta, must first exert a contractile power capable of counter-balancing the weight of a column of blood 90 inches in height, and ·4187 of a square inch in area, or nearly 23 ozs. avr. This is the effect which must be produced, whatever be the absolute force which the heart, acting through its own mechanism, is obliged to put forth to attain the end in view.

To understand how the hæmastatic column is the measure of the resistances which oppose the egress of the blood from the heart, we have only to consider that there would be no resistance, nor any hæmastatic column, if the blood were ejected into free space, or into an empty or half-filled tube; but as soon as any obstacle presents itself to the progress of the blood, it will first fill the tube completely, and then every fresh quantity of liquid injected must, to make space for itself, forcibly push onward the liquid already in the tube; and as liquids press equally in all directions, it will press laterally with the same force that it does along the axis of the tube, and so will elevate the hæmastatic column till it exactly balances the resistance opposed to the progress of the blood.

With respect to the auxiliary forces: it is manifest that the muscular force of the blood-vessels, which exists chiefly in the small arteries, must, by diminishing their area, act as an obstacle to the progress of the blood, and will add to the height of the hæmastatic column, so that no separate estimation of it requires to be made. Neither does the other auxiliary force, the atmospheric pressure towards the chest and heart, require any separate account; for it signally diminishes the resistance to the progress of the blood, and so renders the hæmastatic column less high than it would otherwise be.

Having now examined all the questions which we pointed out as necessarily preliminary, we are prepared to calculate the effective force of the left ventricle of the heart.

We have found that whenever the ventricle contracts, it has to put forth a force capable of balancing a resistance of nearly 23 ozs.; but that force serves merely to make the valve yield before any additional pressure, and so permit the passage of more blood; but we have still to estimate the force necessary to give the blood which passes a velocity of 10 inches per second, which we found to be the velocity with which it flows at the beginning of the aorta.

If the blood moved with a velocity such as its own weight, that is the force of gravity, would communicate, it would pass over $16\frac{1}{12}$ feet in a second, and acquire at the end of it a velocity of $32\frac{1}{6}$ feet per second: and if in any vessel filled with liquid to the depth of $16\frac{1}{12}$ feet, an aperture be made at the bottom, the liquid will issue from it with a velocity of $32\frac{1}{6}$ feet per second. But the blood only moves with a velocity of 50 feet per minute, or 10 inches per second. Now as the velocities of liquids issuing from apertures at different depths, are as the square roots of the depths, a column of no more than ·129533 of an inch in height will give an efflux with a velocity of 10 inches per second. Hence, if in the apparatus (Fig. 1), the long branch of the tube were filled to the height 90·1295 inches, the branch, A, being full or containing 90 inches, if the liquid in the long branch were maintained constantly at the same level, the valve would be kept open, and a constant efflux of 10 inches per second would be maintained, or a current equal to that emitted from the heart.

But an apparatus of which the moving power is a column of liquid 90·1295 inches in height, and kept constantly at the same level, represents badly the action of the heart, which is intermittent; for the ventricle, after the period of contraction is over, remains quiescent for double that period, and so continues its rhythmic movement with alternate periods of action and repose. What change must be made on the moving power of our apparatus to make it harmonize with the intermittent action of the left ventricle of the heart? The two elements of which the moving power consists must be treated in opposite ways. The column of 90 inches destined to balance the resistances to the flow of the blood, does not act constantly, but only while the aortic valve is open, or during one-third of the period from one pulse to another. Hence, instead of being estimated as a constantly-acting force it must be reduced to one-third: which is effected simply by calculating the force of the heart only for the period of the contraction of the ventricle, and not for an entire pulsation. But it is quite the reverse with the other portion of the moving power, the column of ·1295 inch destined to give motion to the blood; for the same rate of motion must be maintained during the whole pulsation, while the moving force acts during only one-third of the time. Hence, this part of the power must be so increased as to give the current a triple velocity, and so make up for the intermission of the propulsive action. But to give a triple velocity the column of liquid must be made nine times higher, and so becomes 1·165797.

Hence, the force put forth at every contraction of the left ventricle of the heart, is equal to the weight of a column of blood 91·165797 inches in height and ·4187 inch in area.

	Inches.
Column balancing resistances, - -	90
Column communicating motion, -	1·165797
	91·165797

	Grains.
Weight of former, - - - - -	9,989·0370
Weight of latter, - - - - -	129·2869
	10,118·3239 or
	23 ozs., 55·8239 grs.

Poiseuille estimates the hæmastatic column in man as equal in weight to 7 feet 1 inch = 85 inches water = 80·952 blood.

80·952
1·165797

Total column, 82·117797 inches, representing a weight of 20¾ ozs., 19 grs, or 21 ozs. nearly.

We have still to enquire what is the absolute force exerted by the heart, that it may tell upon the blood with an effective force of 21 or 22 ozs. (say 22 ozs.) at every contraction of the left ventricle. This is a question that depends altogether upon the mechanism of the heart, which is a hollow muscular organ expelling its contents by the contraction of its own parietes. The internal surface of the left ventricle of the heart is, according to the measurement of Hales, equal to 15 square inches. Now, when the heart contracts, every part of this surface, equal to the aortic orifice (·4187 of an inch), is pressed upon by a weight of 22 ozs., and must react with a force capable of overcoming that resistance. In 15 square inches there are 35·82 such spaces. Multiplying, therefore, 35·82 by 22 ozs., we obtain a total force of almost exactly 49 lbs. Hales' own calculation gives 51 lbs.

Dr Arnott, who measures the surface of the ventricle at 10 square inches, estimates the force of the heart at about 60 lbs. These results are startling by their magnitude. They all approach to or exceed half a hundred weight—a weight which would crush the heart beneath it, and extinguish all power of motion. It is impossible, therefore, not to suspect some fallacy in the process of reasoning by which these extreme estimates are deduced. The fallacy seems to me apparent, but it is much more easy to point it out than to rectify it.

If the surface of the ventricle of the heart measured 15 square inches, and the effective force of the heart be correctly estimated at 22 ozs., there can be no doubt that at the very beginning of its contraction, for an infinitesimal period of time, the ventricle must exert a force of not less than 49 lbs. But it does not continue to contract with the same energy during the whole period of its systole. For this there are two sufficient reasons. In the first place, the internal surface of the ventricle gradually diminishes as it contracts, until at length the whole blood contained in it is expelled. Even therefore if the contractile energy of the organ continued undiminished, it ought to be estimated according to the mean size, and not according to the extreme initiatory size of the ventricular surface. This would diminish to one-fourth the total contractile power exerted by the ventricle. But further, no muscle maintains its contractile energy undiminished during the whole period of its contraction. On the contrary, the experiments of Schwann show that the contractile power of every muscular fibre is greatest when it is fully extended, and diminishes according to a fixed law as it becomes shorter. One-half of the initiatory power is the medium power of a muscle of which all the fibres run in the same direction: and with respect to such a muscle as the heart, which has fibres contracting in the three dimensions of length, breadth, and thickness, the mean contractile power may be estimated at one-eighth of the initiatory power.

It thus appears that the initiatory power of the heart diminishes rapidly from two separate and independent causes; that by the one it diminishes on attaining a medium to one-fourth, and by the other to one-eighth. Combining these two ratios, we have a total medium estimate of one thirty-second ($\frac{1}{32}$). Now if we multiply 22 ozs. by 32, the result is 44 lbs., which would be very nearly the initiatory power of the heart, if we assume the size of the ventricular surface as 13·3984 square inches, intermediate between the measurement of Hales at fifteen, and that of Arnott at ten square inches. The conclusion, therefore, is, that there is no difference between the effective force of the heart estimated at 22 ozs., and the mean absolute force = $\frac{44}{32}$ lbs., or 704 ozs. divided by 32 = 22 ozs. This is in exact accorddance with the general economy of nature, as we see it displayed in the muscular system. In the articular movements she sacrifices muscular energy profusely whenever there is an adequate object to be attained, such as extent and facility of movement. But whenever a great weight is to be lifted, as in locomotion, and other great bodily exertions, she is wisely economical of her muscular force. The same law holds good in the most important of all the actions of the involuntary muscles—the never-ceasing action of the heart—in which the precise amount of muscular power is expended, which is necessary for the end in view.

(To be continued.)

VI.—OBSTETRIC AUSCULTATION, WITH SPECIAL REFERENCE TO THE DIAGNOSIS OF FŒTAL POSITION.*

By J. S. Aikman, *House Surgeon, Glasgow Royal Infirmary, late House Surgeon, Glasgow Maternity Hospital.*

The few notes which I offer here are the result of observations made at the Glasgow Maternity Hospital, during the summer and autumn of 1868, at which time I was House Surgeon to that Institution.

In studying the subject of Fœtal Auscultation, I should be inclined to take up the following points, and in the following order:—1st, Sounds recognised; 2nd, Their mode of production; 3rd, Their value as signs of pregnancy; 4th, Their value as signs of fœtal life; 5th, Their value with reference to the prognosis of labour. All of these, but the last, have been so much written about, that any discussion of them is unnecessary; but the last is little known, and the writing on the subject, so far as it has lain within my reach, very imperfect. On it, therefore, I shall enter more fully.

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V.—Value of fœtal auscultation with reference to prognosis of labour.

This has, I believe, at least in this country, been much underrated; for by its means we may often ascertain circumstances which would materially alter the prognosis we would be inclined to make of the labour. For the ends of prognosis we ascertain—

1*st, The state of the child*—alive or dead.

2*nd, Number of children in utero.*—The great diagnostic point is the discovery of two fœtal hearts; but the difficulty is to say when we have two fœtal hearts. Most certainly we cannot assume it, because we hear the sounds in two different parts of the abdomen. But it has been affirmed that when we hear the double beat, at two different and distant points in the abdomen, and not with increased intensity between them, especially if the one be above and the other below the umbilicus, we must have twins. This, however, is not the case, as such circumstances are not uncommon in dorso-posterior positions. The only certain diagnosis is based on a difference in rate; and if, on careful examination, a difference in rate is detectable, it *is* absolutely certain. But care is necessary; for instance, I examined a case, and found the fœtal pulsations 122 per minute over the pubis, and immediately afterwards 134 above the umbilicus —no sounds audible in intervening space. The natural conclusion, then, would be that this was a case of twin pregnancy; but a second examination over the pubis showed that a similar rise had taken place in the number of pulsations there.

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* The substance of this article was read as a paper before the *Glasgow University Medical Association*, Session 1868-9.

3rd, The sex of the child may, in certain cases, be pretty accurately determined from the intensity, but more especially from the rate of the fœtal pulsations. The intensity is so variable with the amount of liquor amnii, that it cannot be much relied upon; but the rate is not subject to such trifling causes of variation. Even with it, however, it is only in a limited number of cases that we can at all certainly determine the sex. The male heart is generally considerably slower. Thus, if we have a heart beating 112 or 115 per minute, it is most likely the child is male; while if 135 or 140, it is as likely female. Even this, however, is by no means certain.

4th, The presentation and position of the child is more directly connected with the prognosis of the labour, and to it we have a tolerably satisfactory guide in auscultation. This use of auscultation is not much mentioned in works on Obstetrics. My attention was first drawn to it by observing that particular situations for the fœtal heart sounds, invariably corresponded with particular presentations or positions of presentations in the child. As I could find no satisfactory notice of this in the books within my reach, I set about the construction of diagrams which should theoretically represent the position of the heart under the varying circumstances. Many of these I had afterwards to change or modify, principally from not considering the effect of a dorso-posterior position. Soon I took in another element. It is well known that sound passing through various media of differing density is soon lost, especially if it passes from one less to one more dense. So long, then, as the vibrations pass from the solid child to the solid wall of the uterus, and thence to the abdominal wall, they are well carried. But interpose a layer of water, or fluid like the liquor amnii, and a great change takes place. The sound is almost immediately lost. By this means, then, we can tolerably accurately define the borders of the child's body. We can also, by a little practice, define the spot opposite to which the heart is, as the point of centralization of its sounds. Now this point is nearer the left shoulder or side than the right; thus, then, the transmission in that direction will be less, and conversely the direction in which the transmission is least, is that of the left shoulder or side. Before putting this method into execution (which is usually merely to determine position), it is always well to determine the direction of the long axis of the child. This may always be easily done by placing one or two fingers at or near the "os," and then tapping lightly over the fundus uteri, when a point will be found which, when struck, drives the presenting part against the finger at the "os." The line between the two fingers indicates roughly the direction of the long axis of the child. Although no positive rules can be laid down, owing to there being no two cases exactly similar, yet some notes on the more common situation and characters of the fœtal sounds in the various positions may not be inacceptable. These will be merely generalizations from diagramatic notes made at the bed side.

When *the vertex* (Leishman) *of the head presents,* the heart sounds usually centre somewhere near a line drawn round the body about two inches below the umbilicus of the female at full time.

In the *first position* it is a little below the middle of a line passing from the umbilicus to the anterior superior spine of the ileum on the left side. The transmission most extensive towards the middle line.

In the *second position* the point is near the middle line, two inches or so below the umbilicus. Transmission extending to the right.

In the *third position* it is very much in the same situation as in the second, only the transmission is very irregular and not nearly so extensive as in the second. In most cases the distinction is not appreciable; but there are others where it is quite obvious.

In the *fourth position* the most general situation seems to be either the right or left flank, close above the crest of the ileum. Occasionally, also, a less well marked sound is heard a little to the left of the middle line. Transmission very irregular.

Breech presentations are rather difficult of diagnosis. There are not many met with at full time, so that taking breech cases all together, we should say that the sounds were most frequent below the umbilicus; but if we take full time cases only, then we find them almost invariably above it. To say, then, that the most common situation for the heart sounds in breech cases is below the umbilicus is fallacious. Perhaps another consideration may have had influence in favouring this view on theoretical grounds. Every one knows the obstetric aphorism, that if the child be well formed the body will go through whatever the head will, and that thus practically the head comes to be looked upon as the largest part of the child. Then it is argued, the breech being less than the head descends further into the pelvis, and so the whole child is lowered, while exactly the opposite is the case, the breech from its greater bulk standing much higher out of the pelvis than the head. The explanation is, that in the former statement we avail ourselves of the compressibility of the breech. Practically, then, we find at full time that the most common situation is a few inches above the umbilicus, and in dorso-anterior presentations the transmission is most extensive to the left.

In *dorso-posterior* positions the site of pulsation is very irregular.

Of *transverse presentations* I have not had sufficient experience to give any definite opinion. Those I have seen are all dorso-anterior. With presentations of the left shoulder, I found the heart on the right side, and pretty close above the pubis, the transmission being upwards. The only one I have noted of the right had the heart sounds centring a little to the left, somewhat below the area of head presentations. The transmission wholly to the left of the umbilicus.

In following out this means of diagnosis, I always choose cases at full time, and with the membranes unruptured. At other times it is only of use when there is difficulty either from the early stage of the labour or other cause in reaching the presenting part with the finger. It is very much inferior to digital examination when the latter is practicable; nevertheless, I can conscientiously say that I have met with cases where it has proved of the greatest possible advantage.

VII.—CLINICAL REPORT OF CASES TREATED IN THE SURGICAL WARDS OF THE GLASGOW ROYAL INFIRMARY, FROM NOVEMBER 1st, 1868, TO APRIL 30th, 1869.

By GEORGE H. B. MACLEOD, M.D., F.R.C.S.E., F.F.P. and S., *Glasgow; Prof. of Surgery, Andersonian University; and Surgeon Royal Infirmary, and Lock Hospital.*

(Continued from No. 4, Vol. I., p. 465.)

THE following is a short record of the chief operations performed by me in the Infirmary during the six months embraced by this Clinical report, viz., from November 1st, 1868, to April 30th, 1869. Many trifling operations, such as amputation of fingers, toes, small growths, &c., are, of course, not included, as no interest or importance can be attached to such procedures.

1.—*Amputation in Upper Third of Humerus.* M., aged 13. Compound comminuted fracture. Recovery. Soft parts extensively destroyed. No complications. Carbolic acid dressings used before amputation. Operation two months after injury.

2.—*Amputation of Forearm.* M., aged 40. Machinery accident. A primary amputation, and within a few hours. Bones shattered. Little shock. Severe laceration of other forearm. Healed to "a point" rapidly, and without complication, when suddenly, on the 18th day, rigors set in, and he died on the 20th day, of pyæmia.

3.—*Amputation of Forearm.* F., aged 62. Human bite, followed by cellulitis. Was apparently dying when admitted, but so rallied as to give a faint hope to operative procedure. Operation on the 26th day after admission. Stump healed kindly, but a large bed sore caused so much exhaustion that she died on the 19th day after operation.

4.—*Amputation of Thigh in Middle Third.* M., aged 14. Smash of leg and knee by waggon wheel. Great laceration and shock. Primary. Had lain on the wet street and took pneumonia the day after admission. Rallied, but died on the 27th day, when stump nearly healed. No "*Post Mortem*" allowed.

5.—*Amputation of Thigh in Lower Third.* F., aged 11. Scrofulous disease of the knee-joint. Knee completely disorganised, and general health very indifferent. Two years' standing. Rapid recovery, with much improvement of general health.

6.—*Amputation of Thigh in Middle Third.* F., aged 40. Spreading traumatic gangrene. On 23rd day after complicated dislocation of ankle and comminuted fracture of leg. Had to wait many days for a favourable opportunity to operate. Good recovery.

7.—*Amputation at Ankle by Syme's method.* F., aged 14. Disease of tarsus and joint. Disease of 18 months' continuance. Recovery. Stump good.

8.—*Amputation at Ankle by Syme's method.* M., aged 8. Disease of tarsus and joint. Disease of 24 months' existence. Rapid recovery and good stump.

9.—*Amputation at Ankle by Syme's method.* M., aged 13. Disease of ankle-joint. Three years' existence. Stump healed in three weeks.

10.—*Amputation, partial, of Hand.* M., aged 35. Machinery accident. Primary. Thumb preserved. Dismissed with firm, good stump.

11.—*Amputation, partial, of Hand.* M., aged 44. Machinery accident. Primary. Two fingers retained. Good result.

12.—*Amputation, partial, of Hand.* M., aged 33. Gangrene, three weeks after accident. Good result.

13.—*Amputation, partial, of Hand.* M., aged 62. Crush of hand. Primary. Thumb and part of fore-finger retained. Admirable result.

14.—*Amputation, partial, of Hand.* F., aged 14. Mill accident. Primary. Recovery.

15.—*Amputation, partial, of Hand.* F., aged 21. Mill accident. Primary. Recovery.

16.—*Amputation, partial, of Hand.* F., aged 17. Traumatic gangrene. After 14 days. Recovery.

17.—*Partial amputation of Foot.* M., aged 30. Machinery accident. Primary. Recovery.

18.—*Amputation of Penis.* M., aged 50. Epithelial disease. A years' existence. No glandular affection. Rapid recovery.

19.—*Excision of Upper Jaw.* F., aged 25. Malignant epulis. Four months' existence. Healed by first intention throughout.

20.—*Excision of Portion of Lower Jaw.* M., aged 46. Malignant epulis. Did well.

21.—*Excision of Head of Humerus.* M., aged 67. Old dislocation. Recovery, and considerable improvement obtained.

22.—*Excision of Knee.* M., aged 5. Pulpy disease of synovial membrane. Many months' standing. Knee did well, but boy afterwards died of mesenteric disease.

23.—*Excision of Elbow.* M., aged 42. Compound comminuted fracture. At first treated antiseptically. Excision substituted for amputation; but with little hope of success. Died of pyæmia on the 16th day after operation, and the 4th of untoward symptoms.

24.—*Amputation of Mamma.* F., aged 43. Cystic disease. 3 years standing. Recovery.

25.—*Excision of Large Lipoma on Sternum.* F., 39. 10 years' standing. Recovery.

26.—*Excision of Vascular Tumour of Nates.* F., aged 26. A year's existence. Recovery.

27.—*Excision of Labium.* F., aged 50. Vascular growth. 18 months' existence. Recovery.

28.—*Incision of Ganglion of Wrist.* F., aged 29. Several years' existence. Recovery.

29.—*Excision of Ganglion of Forearm.* M., aged 24. Several years' existence. Recovery.

30.—*Excision of Portion of Lip and Plastic Operation.* M., aged 61. Epithelial disease. 6 months' existence. A smoker. Prof. Andrew Buchanan's method of restoring the part. Recovery, and good result.

31.—*Excision of Portion of Lip and Plastic Operation.* M., aged 76. Epithelial disease. A year's existence. A smoker. Professor Andrew Buchanan's method of restoring the part. Recovery, and good result.

32.—*Excision of Portion of Lip and Plastic Operation.* M., aged 63. Epithelial disease. Two years. Not a smoker. Died of acute Bronchitis two days after operation.

33.—*Removal of Tumour of Cheek.* F., aged 41. Epithelial disease. Caustic. Several months' standing. Good result.

34.—*Excision of Tumour of Thigh.* M., aged 56. A Neuroma of Sciatic. 25 years' standing. Recovery.

35.—*Perineal Section.* M., aged 39. Impassable traumatic stricture. Long standing. Many fistulous openings. Pyæmia a fortnight after operation, and death on the 6th day.

36.—*Lithotrity.* M., aged 16. Calculus. Many years ill. Recovery from operation, but died in the Hospital of Diphtheria.

37.—*Tenotomy.* F., aged 5. Talipes Equinus. Congenital. Cured.

38.—*Tenotomy.* F., aged 19. Talipes Equinus. Congenital. Cured.

39.—*Tenotomy.* F., aged 16. Talipes Equinus. Congenital. Cured.

40.—*Tenotomy.* M., aged 3 months. Talipes varus, double. Congenital. Cured.

41.—*Tenotomy.* F., aged 5 months. Talipes varus, double. Congenital. Cured.

42.—*Tenotomy.* F., aged 3 weeks. Talipes varus, right foot. Congenital. Cured.

43.—*Ligature of Piles.* M., aged 23. Extensive. Ecraseur used. Cured.

44.—*Fistula in Ano.* M., aged 44. 18 months' existence. Cured.

45.—*Fistula in Ano.* M., aged 23. 2 years' existence. Cured.

46.—*Fistula in Ano.* M., aged 28. 3 months. Cured.

47.—*Fistula in Ano.* F., aged 20. Some months. Large. Cured.

48.—*Staphyloraphy.* M., aged 24. Congenital. Hard and soft palate. Failed, though very promising for some days.

49.—*Cicatrix of Neck.* M., aged 20. From burn. Improved. Very extensive.

50.—*Phymosis.* M., aged 24. Inflammation from Chancre. Excision. Cured.

51.—*Phymosis.* M., aged 6. Congenital. Mucous membrane burst by Nelaton's instrument. Cured.
52.—*Phymosis.* M., aged 3. Congenital. Mucous membrane burst by Nelaton's instrument. Cured.
53.—*Phymosis.* M., aged 7. Congenital. Mucous membrane burst by Nelaton's instrument. Cured.
54.—*Stricture of Urethra.* M., aged 32. Injury. 2 years' existence. Very close. Dilated. Died of old kidney disease.
55.—*Stricture of Urethra.* M., aged 31. Gonorrhœa. 4 years. Holt's instrument. Cured.
56.—*Stricture of Urethra.* M., aged 52. Gonorrhœa. 15 years. Perineal fistulae. Denonvillier's instrument. Cured.
57.—*Stricture of Urethra.* M., aged 27. Gonorrhœa. Several years. Very close. Said to be impassable. Cured by Wakley's instrument.
58.—*Stricture of Urethra.* M., aged 26. Injury. Three months. Cured by the use of Holt's instrument.
59.—*Stricture of Urethra.* M., aged 37. Gonorrhœa. Five years' existence. Wakley's instrument. Cured.
60.—*Stricture of Urethra.* M., aged 50. Gonorrhœa. Twenty years' existence. Very bad. General health very indifferent. Internal incision by Charriere's urethrotome and afterwards Holt's. Much improved.
61.—*Stricture of Urethra.* M., aged 28. Gonorrhœa. Cured by Holt's instrument. Two years' standing.
62.—*Stricture of Urethra.* M., aged 25. Gonorrhœa. Cured by Holt's instrument. Some months' existence.
63.—*Stricture of Urethra.* M., aged 46. Gonorrhœa. Twenty-two years' existence. Gradual dilatation. Cured.
64.—*Lacerated Perinœum.* F., aged 18. After instrumental delivery. Cured.
65.—*Excision of Prolapsed Bowel.* F., aged 12. Intussusceptio. Died. Ecraseur used, and 16 inches of bowel removed.

The large number and variety of operations comprised in the foregoing Table affords the best evidence of the extensive and valuable field for surgical observation presented by the Glasgow Infirmary, as it exhibits only the fourth part of the entire surgical practice of this hospital for six months.

During the period embraced by this report, several cases of that veritable "hospital pest," pyæmia, occurred in my wards. In the case of amputation of the forearm, the wound was nearly closed, though the laceration on the other arm was suppurating freely. The patient was of good courage, strong uncontaminated constitution, had not suffered violently from shock, nor been exposed to fatigue after injury, and he was well fed and lay in an airy ward not unusually crowded. It illustrates the old observation, that "so long as a drop of pus exists in a breach of surface pyæmia may arise." It was no unlooked for complication in case 23, as the shafts of the humerus and forearm bones were comminuted and open, while the patient would not part with his arm. The occurrence of purulent poisoning was anticipated here from the first. In case 35 the advent of pyæmia was not extraordinary, seeing that the patient's broken-down state of health made him particularly liable to it; and the operation (perineal section), not the least apt to be followed by such a sequel. The operation was performed with but a slender hope of benefit, and its fatal termination was recognised at the time as the most probable eventuality. Disinfectants and antiseptics are unquestionably great aids in preventing purulent infection, but it is to the strenuous support of the strength by food and stimulants, by the ample supply of fresh air, by sustaining the courage, and enforcing cleanliness, that our attention should be chiefly directed.

Case 6 was a very interesting one. The patient, a large, stout, intemperate cook, had fallen when intoxicated, on New Year's Eve, and dislocating the right ankle, thrust the leg bones through her boot. In this deplorable condition she had made several attempts to walk. The soft parts were greatly bruised and begrimed with dirt. There was severe shock on admission, and her state otherwise made operation impossible. The dislocated and fractured bones were replaced, and an antiseptic treatment adopted. Next day traumatic gangrene had begun, and though the constitutional implication was never severe, the local affection spread rapidly, especially up the back of the limb, which in two days was dark to the popliteal space. She was very weak, and had an unsound heart, and it was thought best to wait, while the most sustaining food was administered. No position can be more difficult than that of a surgeon called on to decide what to do in such circumstances. The disease is rapidly marching up the planes of cellular tissue to the trunk, and then death occurs. Is he to try and sever the limb above the point invaded? Let him do so, and how often (especially in the lower limb) will he have to witness the mortification re-appear in the stump, and that notwithstanding his leaving a wide margin of what *appears* sound tissue between the dark line and his place of election. But if he waits in the hope of a "line of demarcation" forming, he will be yet more frequently disappointed, as the chief cause of the disaster is in the state of the system, and thus he would often look in vain for any limit to the local affection. "The dying action" soon pervades the whole body, and all hope of safety is past. In this case we had a typical example of those in which spreading traumatic gangrene is most apt to arise. An intemperate, over-fed person, whose circulatory and excreting organs were very weak, sustaining a most severe, contused, and lacerated wound, implicating a large joint. The early appearance of the affection clearly disproved its dependence on hospital influences.

After some days her general condition slowly improved, and as the intensity of the local affection diminished, I watched carefully for the most favourable moment to remove the dead portion of the limb, but it was not till the 23rd day after the accident that the state of affairs allowed me to interfere, and then amputation was performed in the middle third of the thigh. The covering was taken entirely from the front, the soft parts behind being cut across almost as high up as the point at which I divided the bone. In this way I tried to get quit of the dead and dying tissues, and gained what I look upon as a most desirable formation of stump, viz., a long and full anterior flap, which thoroughly covered the end of the sawn bone; which fell naturally into its place, and was easily retained—one which allowed of the most perfect drainage without daily adjustment—which permitted of constant surveillance without disturbance; which covered the bloodvessels and nerves well, and placed them out of the way of pressure; which finally would keep the cicatrix far away from the end of the bone. It is well when the kind of injury or disease allows of such a mode of operating, as with every desire to obtain such an adaptation of the soft parts, it often happens in an hospital such as ours that we can follow no classical method, but must use what tissues can be had to cover the bone, rather than sacrifice more of the limb, and so increase the risk.

The stump in this case was enormous. It was supported on a pillow, only a few deep sutures were passed, and great gentleness used in dressing,—if I may so designate the frequent removal of a tin cup containing a disinfectant placed so as to receive the discharge, and the occasional introduction of a clean towel under the pillow, which, itself being protected by gutta percha tissue made to adhere closely to it by wetting it with chloroform, did not require renewal. I believe that a most material point in the management of stumps lies in disturbing them as little as possible, and this is best attained by such an arrangement as that referred to. As no dressings were used, there was no need of daily movement, and the discharge getting quickly away, and its odour being at once destroyed, removed the chief call for frequent interference. There are, in my opinion, few stumps which benefit by the employment of many sutures. Generally speaking, most of the sutures have to be removed in a few days, having cut their way out or done harm by the tension they occasioned. If union by first intention is to be reasonably expected, many sutures may, of course, be advantageously introduced, but it is very rarely in limb amputations in hospitals that such a happy result is secured.

Opium, quinine, whisky, and strong soup, were freely used in the treatment of the patient above alluded to, and though a very limited slough formed on the back of the stump, yet it did not much delay her recovery, which was perfect.

Of amputation at the ankle-joint I have lately written at length elsewhere.*

In the after-management of lacerations and partial amputations of the hand and foot, I employ the system of continuous irrigation first recommended by Berard, having had simple wooden stands constructed, to elevate and contain the basin, and the current being conducted to the part by a skein of worsted thread. The temperature, medication by disinfectants, astringents, &c., will vary with the requirements of the case. I have had every reason to be highly pleased with the results thus obtained. Inflammation is quickly subdued, pain alleviated, sloughs separated, and a good granulating surface encouraged. By raising the temperature of the water, or substituting wet lint and oiled skin after the granulations are formed, no arrest of the healing process takes place, as is apt to occur if very cold water is continued too long by irrigation.

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* *Brit. Med. Journal*, August 28, 1869.

In case 5 amputation had to be employed in place of excision, from the condition of the patient precluding the hope that she could undergo the ordeal of recovery from excision. She made, as is usual in such cases, a rapid and good recovery after the amputation of her thigh.

Case 19 was a very encouraging one. The patient, a girl of 25, had observed a swelling on the gum of her left upper jaw four months before coming into hospital. This was taken for a gum boil, and so treated. When the true nature of the tumour was discovered, it was twice removed, once by ligature, and once by the knife—being merely shaved off. It grew more rapidly after this, and on admission in February the growth occupied the whole line of the alveolus, and extended beyond the posterior edge of the bone. It appears to have begun (as is not uncommon) in connection with the socket of a "bad tooth," and so was mistaken for a gum boil. It was a vascular softish mass, with portions hard and fleshy; irregular and nodular in outline; reddish-purple in colour; firmly fixed to the jaw; and ulcerated at various portions of its surface. The pain was slight, but the growth of the mass was marked even from day to day. The cheek was projected, and the tumour was so extensive, that excision of the whole bone had to be performed. The incision into the nostril, up the side of the nose, and across under the eye to the malar bone (Dieffenbach and Ferguson's method) was used. No difficulties whatever were met with, and only one small vessel had to be twisted. She knew nothing of what had been done when she awoke from the chloroform, and she made a rapid and uninterrupted recovery, the wound uniting by first intention, and without any suppuration whatever. The good effects of such a solution of chloride of zinc, as was recommended by Mr De Morgan, was well illustrated in this (as in many other cases), as no foetor whatever was observed during recovery. This patient came back to show herself lately, and the amount of deformity was so trifling as hardly to attract attention.

In case 21, the head of the humerus was excised to get quit of the severe pressure it was causing on the blood vessels and nerves, and to re-establish some movement, if possible, at the articulation. The man was 69 years of age, and had three months before sustained that form of dislocation, which was designated "sous-glénoïdienne" by Vidal and Malgaigne. The hand and forearm were greatly swelled, the pain was so severe as totally to destroy his rest day and night, and his general health was giving way in consequence. When under chloroform the bone was found to be quite immovable to the amount of traction which it was thought safe to apply. I excised the head of the bone (but not without some difficulty and the exercise of much patience and care, from its high position and firm adhesion,) by a straight posterior incision, which I mostly prefer, as it allows of perfect drainage as the patient lies in bed, and also permits of easy access to the joint. Twice within a few days hæmorrhage occurred, and greatly enfeebled a man already very weak; but by careful support he soon began to make way, and in two months he left the hospital greatly improved in every way, his general health secured, his arm moveable, and capable of being to some extent employed, the swelling and pain abated, and, in short, in a condition most acceptable to himself, and very satisfactory to me. This being, in a great measure, an "operation de complaisance," was not undertaken by me without due consideration and free election by the patient, after its risks had been explained to him.

Case 24 was a well-marked example of cystic sarcoma of the mamma. The patient was 43 years of age, married, and having no family. It was her right breast which was affected. The growth was of three years' standing, beginning as a small pea deep in the breast, just as her catamenia ceased. It was discovered by accident, and at first caused no pain. Her general health continued unaffected. There was no hereditary taint discoverable. The tumour occupied the greater part of the breast, was prominent, and, when handled, slightly painful. It was heavy, (not so much so, however, as scirrhus,) nodular, fluctuant at some parts and dense and hard at others. The cysts exceeded the solid fibrinous matter in their entire bulk. The tumour was quite moveable on the underlying parts, and the skin, though considerably distended, was not bound to it. The nipple was normal, and the axillary glands were but little affected. It had grown steadily, and with very little pain. After excision, one large and many smaller cysts were found in the growth, containing thick yellowish fluid (colloid?), and the mass was made up of fibrinous material hard and dense, which "cried out" when cut with the knife. The microscope showed this material to be fibrous. The patient made a good recovery.

In removing epithelial disease from the face, I have frequently employed the pencils of chloride of zinc, so much used by Maisonneuve. In case 33 I substituted this treatment for excision, with the best effects. The mass, which was as large as a florin, separated on the 4th day, leaving a clean, healthy, granulating surface, which healed very quickly.

In excising portions of the lip, I have for some time employed forceps made after my instructions by Mr Hilliard, which steady the part, compress the bloodvessels, and by their shape guide the knife so as to make the incisions parallel. One pair being placed on either side of the portion to be removed indicate exactly the line of incision, and hence, when one side is cut, and so the stretching of the part removed, there is no chance of the second incision (I refer to the V shaped cut) being irregular, and so the cicatrix unseemly. These little instruments also most effectually command bleeding, without the aid of pressure applied by an assistant (whose fingers come otherwise much in the operator's way), and as the sutures can be inserted between the blades, (*i. e.*, without disturbing them,) the whole proceeding is much expedited, and made almost bloodless. These forceps do equally well for harelip. For the restoration of the lower lip in ordinary cases, after the excision of epithelial disease, the operation introduced by Professor Andrew Buchanan is, I think, much the best. This operation is often erroneously attributed to Professor Syme.

Case 34 was an unusual one. The man was aged 43, and had a well marked neuroma as large as an orange on the sciatic nerve, about the middle of the posterior surface of the thigh. He had also many other growths of slow formation beneath the skin and in the muscles, which appeared, with the exception of the one operated on and another, to be multiple fatty, and sebaceous tumours. The growth on the fore part of the same thigh as that on which the neuroma had formed was apparently fibrous. The neuroma was of 12 months' duration, and presented all the leading signs of such a tumour. It was placed over the course of a nerve; was oval in shape, its long diameter being in the axis of the nerve. It was moveable from side to side, but not in the course of the nerve. It was firm to the touch, and had a smooth surface. Strong pressure or free movement caused considerable pain, flashing down along the distribution of the nerve, towards the periphery, and causing some involuntary spasm of the muscles. When left alone it caused almost no uneasiness, though evidence of deranged innervation (formication, tingling, &c.), was sometimes apparent. The growth of the tumour had been slow, and the skin was unaffected. The patient clearly connected certain aggravations of his pain with lowered temperature, and derangement of his general system. When he works the pain gets severe, and he came into hospital to have the growth removed. The neuroma was placed on the posterior surface of the nerve, and slightly separated some of its fasciculi ("lateral neuroma"). It was easily enucleated, and the nerve was apparently uninjured, nor did it afterwards give any indication of having suffered harm. After removal, and being washed, the tumour had the usual greyish colour, elastic firm feeling, and fibrous-like section of a neuroma. The central part had undergone degeneration, and was semi-diffluent. Two small cysts lay near its circumference. Microscopically it had all the characters of a fibrous tumour. This patient, by the operation, got free of the annoyance he suffered in his limb, and was dismissed well.

In the treatment of phymosis, I have repeatedly tried Nelaton's instrument, which over-distends the foreskin, and ruptures the mucous membrane, and for congenital phymosis in young boys I think it acts admirably, but for adults it has hitherto failed in my hands. The degree of expansion of the blades is easily regulated, and the pain is slight, the whole operation being instantaneous. I have long believed that the structure at fault in ordinary cases of phymosis is the mucous membrane alone, and that if we incise or rupture that, the skin may be left alone. In adults I have consequently practised the simple incision or scoring of the mucous membrane, (a trifling and painless proceeding,) in preference to circumcision, or any of the lines of incision through the whole tissues, which have been recommended by various surgeons.

I have lately, in the *British Medical Journal*, given an outline of the treatment (and results) of Stricture of the Urethra pursued by me in the Infirmary, during the period included in this report.

To complete this summary, I will append a short notice of one other case, as illustrating the good effects of firm pressure and fixture in the treatment of un-united fracture. A ship carpenter, aged 29, was admitted with un-united fracture of the bones of the left forearm, the result of a compound fracture received and treated in Newcastle a year ago. The limb was encased in splints after the accident, and these appeared to have been frequently shifted. The ends of the fragments had been exposed and excised when it was found that the fracture had not consolidated.

After this he returned to Scotland, and entered the Infirmary here. The forearm was found to be considerably deformed (shortened and bent), and no union by bone had occurred. The seat of fracture was at the union of the middle and upper third of both bones. Several discharging sinuses existed in the soft parts. The hand was useless. His general health had suffered considerably. Full diet and porter were ordered, while his arm was straightened and put up firmly in splints which accurately fitted the part. Provision was made for the escape of the pus from the sinuses, and the splints were not touched for a considerable time, and then re-adjusted without causing any movement to the part. The manipulation necessary to give the arm a good shape caused a good deal of irritation and pain, but this soon subsided, and when at the end of a month the splints were removed, the bones were found to be quite firm and the sinuses healed. A starch bandage was then applied, and he was dismissed.

Finally, I may briefly allude to one case, which was a singular example of what severe injuries some men may recover from, and so contrasts agreeably with the many we meet with, which, but too forcibly, illustrate the contrary. An Irish labourer, aged 32, was buried in a mass of falling debris at the Blochairn Iron Works on the 29th January. The catalogue of his injuries was as follows:—Dislocation of the left humerus into the axilla; compound comminuted fracture (with laceration of a considerable arterial branch,) of left femur; fracture of the right "os innominatum;" very severe bruise over the liver, causing a most extensive ecchymosis; and finally, fracture of the right scapula! I was in the ward when he was brought in along with others hurt at the same time, and he thought so little of his injuries that he begged me to attend to his fellow-sufferers first, as he could wait. The quiet, self-possessed temperament thus shown never deserted him, and, doubtless, greatly aided his recovery, as he never had a bad symptom, and went out with all his bones firmly knit, his general health good, and his thigh of perfect length.

VIII.—NOTE ON FEEDING BY THE NOSE IN FEVER.

By GAVIN P. TENNENT, M.B., *Resident Physician, City of Glasgow Fever Hospital.*

EVERY physician who has been to any extent engaged in the treatment of Fever, especially typhus, must be familiar with a complication which frequently occurs, viz., real inability, or obstinate refusal from delusions, to swallow the milk, beef-tea, &c., so absolutely necessary to successful combating of the disease. From its very nature it is a complication of unfavourable prognosis, which is heightened by the fact that the means ordinarily resorted to in artificial feeding almost invariably provoke a great amount of opposition and struggling, and consequently often prove ineffectual or even injurious.

In the following remarks I wish to recommend very strongly the more frequent employment of a method of feeding sufficiently familiar to many, though comparatively seldom used. It may be here remarked that the cases which are most likely to be benefited by feeding are those where the patient refuses to swallow, but even in cases of real inability, or the dysphagia proper of treatises on fever, it does occasionally conduce to a satisfactory result.

The means hitherto adopted in artificial feeding at the City Fever Hospital have been successively:—1st. The stomach pump. 2nd. A No. 12 gum elastic catheter passed through the ordinary gag, and connected with a double action enema apparatus. 3rd. A catheter introduced as before, a small glass syringe being substituted for the enema bag. 4th. A feeding spoon with a tubular handle, the nostrils being at the same time closed. 5th. Nutrient enemata. All these methods are imperfect, and occasionally, from the struggling of the patient, produce more exhaustion than is compensated for by the nourishment assimilated. The use of the stomach pump presents at the outset the difficult and disagreeable necessity of forcing open the mouth for the introduction of the gag, the patient meantime contending against and obstructing the efforts of the physician. Even after the gag is introduced he can constantly gnaw it, and thus there is always existing an incentive to resistance. The exhaustion induced thereby is sometimes very great, and may even cause death by syncope. Dr Russell has met with such a case, in which death occurred immediately after the passing of the tube, which was violently resisted, and before it could be withdrawn, much less used. The catheter is liable to the same objections, as the stomach pump, though in a less degree; while the feeding spoon is still more unsatisfactory. Enemata may be effectually resisted, —voluntarily rejected after administration,—and in severe cases they are seldom wholly retained.

The method which I prefer to all these and recommend is that of nasal feeding, by passing a gum elastic catheter through the nares into the œsophagus, and then using an ordinary glass syringe. The nasal passages present an entrance over which the patient has no control whatever, either during or after introduction; and generally, when the slight amount of preparatory struggling has been overcome, he resigns himself contentedly to such measures, the hopelessness of resistance being evident. It has now been employed at the Fever Hospital for some time with the most pleasing results, and is found to be at once easy of execution, entirely devoid of danger, and thoroughly effectual. A catheter and syringe are always at hand, and they can be used with so little trouble that when the symptoms arise no time is lost; and so the rapid and irretrievable sinking which ensues when no food is being taken is avoided. A brief record of two cases at present in hospital, and both now convalescent, will indicate more clearly its applicability. The full report from the Hospital Journals, will be found in the Clinical Record of this number. It will be seen that in one case for a period of eleven days, the patient was kept alive by nasal feeding, and that at one period, the 13th day, she was pulseless, and certainly would have died but for the administration of food by the nose, the reviving effect of which was marvellous. In the other case, a male, aged 55, was raised from a seemingly hopeless condition by this treatment. Many cases equally striking have occurred. In both of these cases there was at no time any difficulty experienced in the administration, while there was almost no struggling.

In the *Lancet* of March 20th and 27th, 1869, Dr Moxey contributes some interesting remarks on nasal feeding, in which he affirms that this method is still insufficiently recognised, and highly commends its comparative excellence in insanity and some other diseases. He, however, uses a Wedgewood funnel, introducing the end of it into one of the nostrils, and then pouring into the funnel, from a cream jug or other vessel, the fluid nutriment.

In fever, at any rate, I consider that the employment of a catheter is to be preferred. With the latter there is no need for watching the respirations, as there must be with the former; but what is of still greater importance is that in cases of typhus the reflex sensibility is much diminished, and the epiglottis is often held vertical by agglutinated secretions, or, at all events, closes imperfectly, so that there would with the funnel be very considerable risk of some portions of the fluid passing into the larynx. This with the catheter is impossible. The only conditions to be attended to in its use are:—1st. To oil it. 2nd. To see that it is not too flexible, as if so, it is apt to bend in all directions, and thus be more difficult to pass. 3rd. To remember that it may be passed into the larynx, its presence there generally produces irritation and coughing; and moreover, air passes through the catheter. 4th. After the catheter is introduced, to watch that it does not slip back through the nares. This may seem an unnecessary caution, but where the nasal passages are large, the patient breathing heavily through the nose, and involuntary deglutition occasionally occurring, it might happen. In the event of its slipping too far back to be laid hold of in the nares, it will be no easy matter to extract it by the mouth. A string attached to the catheter will guard against this possibility. 5th. If the catheter is not readily passed by the one nostril, try the other.

IX.—CLINICAL NOTES ON EXTRACTION OF CATARACT.

By J. R. Wolfe, M.D., F.R.C.S.E., *Surgeon to the Glasgow Ophthalmic Institution, Lecturer on Ophthalmic Medicine and Surgery in Anderson's University.*[*]

In reviewing the work of the *clinique*, attention is specially directed to the results of cataract operated on, all of which resulted in the restoration of vision. Of these there were:—

2 Traumatic, with laceration of the cornea.
1 Traumatic, with laceration of the cornea and iris.
2 Zonular.
10 Senile, at ages varying from 49 to 81.

In the traumatic cases the operations were performed at once under chloroform; in one the lens was removed without iridectomy, and in the other two, iridectomy was performed. The two zonular required only formation of new pupils.

In the 10 senile cases the mode of operation was that detailed in the lecturer's work on the subject,[†] iridectomy being performed from a fortnight to six weeks prior to extraction, and the lens removed by a small corneal or corneo-conjunctival flap, the incision extending over more than a third of the corneal circumference. The advantages of this operation, as there pointed out, are:—1. Previous iridectomy prevents a whole string of accidents during and subsequent to the operation. 2. No contracted pupil preventing its exit, the lens can easily be extracted by a small incision, which facilitates speedy union. 3. It does not require long confinement, and does not distress the patient. 4. It is applicable to cases of local and constitutional complications, in which the old operation is inadmissible.

The favourable result of these 15 cases taken *per se* might not conclusively support the claims of this operation, had the cases been picked; for it might be conceivable that a combination of circumstances had occurred to produce it.

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[*] An abstract of the concluding lecture of the course of Ophthalmic Surgery, delivered in Anderson's University during the last summer session.

[†] An Improved Method of Extraction of Cataract, with Results of 107 Operations. Churchill & Son. London.

The following cases are, however, worthy of notice, as connected with complications which would have rendered the old operation inadmissible:—

CASE I.—Mr T. D., aged 58, rheumatic, with tremulous iris and undilatable pupil. Iridectomy five weeks before operation; lens extracted with small loss of vitreous. Result, reads No. 6 of Jaeger, with 2½ convex lenses, six weeks after operation.

Daviel's method was plainly here contra-indicated. The case would have been dismissed by our late eminent master, Dr Mackenzie, as incurable. Graefe's modified linear extraction would have been attended with great risk, the lens being apt to sink, and the vitreous to prolapse—the worst accident in extraction; any method requiring pressure for extrusion of the lens, becomes in such a case doubly hazardous when the incision is made in, or close to the sclerotic. The modification of Graefe's method, which terminates the incision in the corneal substance, might have had a better chance of success, but not without chloroform, the use of which seemed to be objectionable, owing to the highly rheumatic diathesis.

CASE II.—Mrs M'L., aged 65. Deaf, and labouring under disease of the spine, rendering long confinement impracticable. Iridectomy six weeks before extraction. Result, reads No. 8, four weeks after operation.

CASE III.—F. G., aged 52. Iridectomy four weeks prior to extraction. Result, reads No. 10, six weeks after operation.

This patient was affected with what Mr Paget has termed stammering of the bladder—could not pass urine except in a standing position, and that, when nobody was present; was therefore allowed to rise at his pleasure after the operation. There is no need to advert to chances of the old operation in such a case.

CASE IV.—Mrs M., aged 62. Affected for five years with chronic diffused granulations to such an extent that closure of the lids for one day resulted in the formation of pus, as shown by microscopic examination. Iridectomy eight weeks prior to extraction. Result, reads No. 10, eight weeks after operation, granulations persisting.

Such a case could not have been dealt with by any operation requiring closure of the lids for several days.

It may, therefore, be held established that this operation is a decided improvement, as enabling cases to be treated which would otherwise have been dismissed as incurable, and also as removing from the operation for cataract its hap-hazard character, and rendering failure an exceptional event. The safety lies in the facility of removal of the lens, and in the rapidity with which union takes place.

The cases were under the daily inspection of the students, and in all of them no lacrymation occurred for more than a few hours after the operation. The rapidity of union was clearly demonstrated in the case of Mrs S., aged 81, (Case V.) where one eye had been operated on elsewhere and lost, and where, three days after the operation on the remaining eye, the patient was driven down in a cab to the University, to be exhibited at the introductory lecture, and although liberties were taken with the eye, testing vision, &c., no inconvenience, not even lacrymation followed. She reads No. 2 (Pearl type), ten weeks after operation.

In submitting this short resumé, I may mention a case which is now under treatment. (Case VI.) Mr R., aged 35, cabinetmaker, three months ago, got a piece of iron into his lens, resulting in cataract. On Sunday I extracted the lens, and on Wednesday, three days after the operation, the patient was dismissed cured. Reads the signboards on the opposite side of the street seven days after the operation. I mention this case, which does not belong to the preceding 15 cases, to show that speedy union is the rule in this improved operative method.

X.—ABSTRACT OF RECENT OBSERVATIONS ON RELAPSING FEVER.*

(*From the German.*)

I. Dr Obermeier's paper† extends to two parts, and is based upon the study of 85 cases of relapsing fever, treated in the Charity Hospital, Berlin, from November, 1868, to May, 1869, under the care of Prof. Virchow. The patients for the most part belonged to the destitute portion of the working classes, and to the homeless and ill-nourished poor.

General Symptoms and Course.—Headache and *malaise* are occasionally felt for a few days; but usually the disease sets out suddenly, with shivering, followed by feverishness, pains in the loins and forehead, and cramps in all the limbs, especially the legs, sometimes intense pain in the nape of the neck, general lassitude, loss of appetite, and thirst; and occasionally, also, pain in the belly, nausea and vomiting. Great debility comes on, the patient's limbs give way beneath him, although, for a few days, especially in the morning, they may drag along for some distance. The bowels are at first costive, but subsequently there is apt to be diarrhœa. In the course of three or four days, in many cases, pains in the hypochonders are felt, and those in the legs become spasmodic; the heat is excessive to touch, and mental activity is diminished. The patient, at first excited, becomes apathetic. In some, especially habitual drunkards, delirium appears a few days before, and may last so long as a day after, the crisis; in young persons it may appear with the crisis, but at once passes off. Noises in the ears and deafness are uncommon. The taste is usually perverted. There is generally loss of appetite, seldom complete, but diminished, until the crisis occurs; but even with a temperature* over 105·8° F, cases are not rare in which the customary quantity of food is taken without interruption. On the second or third day after the crisis the appetite returns, and continues vigorous until the relapse.

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* Relapsing fever has not been seen in this country for some fourteen years; consequently, the younger members of the profession have had no opportunity of studying it. Since this form of fever has appeared in London, and may be expected to spread in our large towns, wherever the circumstances of the poor are such as to favour its outbreak, an analysis of the most recent observations made on the Continent, where it has been epidemic, especially in various parts of Germany, for more than a year, cannot fail to be valuable. We purpose, therefore, to give a brief abstract of these papers, which have been published in recent numbers of *Virchow's Archiv*, first presenting the vivid general picture of this interesting disease as it appeared to these observers, and then endeavouring to select what is new, or what seems to elucidate doubtful points in its course and general pathology, including also what is said of the treatment.—J. B. R., J. C.

† *Ueber das wiederkehrende Fieber*, von Dr Obermeier, Assistenzarzt an der Charité zu Berlin. *Virchow's Archiv*, Bd. xlvii., pp. 162 and 428.

There is always a catarrhal condition of the mouth and fauces. *The tongue* of relapsing fever is very characteristic; it is "delicate raspberry-red, moist, somewhat swollen so as to show marks of the teeth, rounded in front, and covered, except at the sides and tip, with a thick, whitish fur." It is very rarely dry, and even when the temperature is at the highest, the mucous lining of the mouth is never parched. In the intermission the tongue cleans, but continues swollen, returning with the relapse to the former condition. There may then also be pain on swallowing, from catarrh of the pharynx.

In about half the cases, *the lungs* were more or less affected, chiefly with catarrhal symptoms, but hypostatic congestion, bronchitis, œdema and pneumonia were also observed. This last occurred in two cases, and proved fatal. The respirations during the attack were laborious and frequent even without lung affection.

The *heart* sounds are impure, rough; the second peculiarly broad. Very frequently with a high temperature, and especially in the last two days of the attack, there is a systolic bellows-murmur, most audible in the second intercostal space on both sides; sometimes as far as the neck in the course of the great vessels. In these cases, the pulse was thrilling, and the murmur disappeared about the fourth day after the crisis. It is usually weaker at the apex, or inaudible, and probably originates in the vessels. Sometimes it seems to arise in the ventricles, when it is loudest over the heart. Then the murmur may remain some time after the fever has gone. The *pulse*, at first full and tense, becomes dicrotous, undulating, and at the height of the fever, especially at the crisis, thrilling and weak, as if the relaxed arterial wall yielded without resistance to the advancing blood. This condition is perceptible in all the arteries which can be observed; and at the same time there is a systolic blowing murmur, which is not caused, as has been said, by the pressure of the stethoscope, since in good cases it is audible to the ear alone, even at a slight distance from the vessels. In frequency, the pulse at the outset was 108–144; at the crisis it fell rapidly to 60–48, and continued so until the relapse, when it rose as before. Sometimes the pulse fell before the temperature at the crisis.

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* All the temperatures in these papers are *Axillary*.—J. B. R.

The *liver* is very commonly enlarged, painful in itself and on pressure. The lower border extended to between the umbilicus and xiphoid process, or even to within an inch ot the umbilicus, while the upper was raised to the fourth intercostal space. The dulness increased on the fourth and fifth day. On the departure of the disease it resumed its former dimensions.

The *spleen* was usually somewhat painful, always enlarged, averaging 5½ inches in length by 3½ in breadth, reaching forward as far as the mammillar line, sometimes palpable below the arch of the ribs. No diminution ever took place before the third day after the crisis, and then not to a great extent. In the relapse, it increased in size, but generally did not surpass its former limits. At the last crisis it gradually shrunk, and in three or four weeks resumed its old dimensions, though sometimes an enlargement was perceptible for two months after.

An inflammatory condition of the *kidneys* supervenes in about two-thirds of the cases, recognized from the occurrence of tube-casts, with œdema, and generally lumbar pain. This is a circumstance which has not previously been distinctly stated. Of 40 cases, in which the urine was examined with the microscope daily throughout the disease, in 32, Dr Obermeier found the appearances of acute renal disease. The larger proportion were over 30 years of age. The symptoms are these:—So early as the second day of the first attack we observe blood and dark tube-casts in the urine; the blood corpuscles are more or less numerous, frequently rolled together in the form of cylinders. The tube-casts contain, tolerably well preserved, only somewhat indented, usually strongly shining granular epithelium; others contain further changed epithelium, which is either merely cemented together with albuminous material, or poured out in it. The epithelium usually appears somewhat enlarged; by the third and fourth day of the disease it is mostly disrupted. Even on the second day we observe, besides the dark tube-casts, others which are clear, covered with the granular detritus of epithelium, and with large shreds. The granular detritus seems composed of bright, fatty, sharply-defined little drops, and is often imbedded in a compact mass in the albuminous stroma of the cast. The dark yellowish brown tube-casts, which may be present even after the crisis, subsequently disappear by degrees, and also the granular deposit in the clear casts, so that at last perfectly pale cylinders are voided. In one case only were pus-corpuscles enclosed in abundance in the fibrinous casts. In a few instances occasional pus-corpuscles were found in the pale casts. The casts are sometimes so numerous as to form a sediment in the urine. On an average, this entire process ended eight days after the decided fall of the fever.; but it may continue two or three weeks. The tube-casts described correspond to those which are seen in nephritis going on to atrophy (Frerichs.) The conclusions are:—(1.) Blood-casts and dark tube-casts in the urine of relapsing fever are signs of acute renal disease. (2.) That so long as dark tube-casts appear in the urine, fresh portions of the kidney are being attacked, and they indicate the gravity of the process. (3.) When the pale tube-casts preponderate in number, this process has lost its acute character. It is evident from its course that we have to do with an acute nephritis, in most cases passing off without visible sequelæ. Dr Obermeier had no opportunity of determining the lesion *post-mortem*. From the mucus, pus-corpuscles and abraded epithelium, which abound in the urine, and indicate a slight catarrh of the urinary passages, he inclines to regard the renal affection as also catarrhal; and from its frequency, he holds it to be not an accidental complication, but an essential part of the phenomena of relapsing fever.

The *urine* diminishes in quantity, but rises in specific gravity during the attacks, increasing in quantity, and falling in specific gravity at the intermissions. During convalescence there was almost daily increasing diuresis, even reaching 6000 Ccm. per day. Blood was frequently present during the attack. Urates were occasionally abundant immediately after the crisis, and triple-phosphates in small quantity. Albumen was commonly found.*

The *skin* is at first hyperaemic, then pale, dry, and pungently hot. In four cases, old drunkards, at the crisis the skin became sallow, the sclerotic being bright yellow; only one case of intense jaundice occurred. In the majority of cases there is a mottling present which reminds one of typhus. It is plainest in the lower limbs, and most marked around the hair-follicles and sweat-glands. In rare cases petechiæ even of some size may be found. But, as a rule, there is no exanthem in this fever. There is always desquamation, chiefly of the face, chest, and limbs.

In the second part of his paper, Dr Obermeier turns to the study of the *special febrile symptoms*, which, from the absence of grave local affections, may be observed with great purity in relapsing fever.

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* See abstract of Mr Riesenfeld's paper for the chemistry of the urine, founded on analysis of the urine in Obermeier's cases.—J. B. R.

The crisis is ushered in by copious perspirations and rapidly falling temperature. The perspiration not unfrequently precedes, appearing even while the temperature is still rising.

The *vascular excitement* is very striking at the height of the fever. The superficial arteries visibly throb; the head may even be observed to move synchronous with the pulse. The rate of pulsation bears no relation to the temperature. Its peculiar quality is observed only at the acme, and depends on atony and relaxation of the muscular tissue of the vessels. leaving to the elastic tissue the resisting of the pressure of the blood, and so producing a vibration of the walls, and causing the audible murmur already described. This peculiar vascular condition also accounts for the local congestions and hæmorrhages, chiefly in the form of epistaxis.

Although the respirations correspond to the temperature, and occasional delirium must be ascribed to a *high temperature*, it is evident that in that alone the danger does not lie. Relapsing fever affords abundant proof that in certain circumstances the body may bear the highest temperatures without perceptible effect. According to Weikardt coagulation of the blood in the vessels takes place at 108·6° F. Wunderlich regards temperatures of 107·6° F. as in general dangerous. Liebermeister states that a temperature of 107·6° F. is followed by speedy death. Of Dr Obermeier's patients, the temperature of three rose to 107·6° F., of six to 107·7° F., and of two to 108·5° F. In all these cases no special danger attributable to the high temperature could be discovered, nor even a single circumstance in which they differed from the rest; except, perhaps, a certain mental drowsiness, or slight delirium. The low temperatures observed after the crisis are equally striking, in one case descending to 92·6° F. Relapsing fever is thus peculiar in the enormous departure, in both directions, of its temperatures from the normal.

During the attack the fever has a remittent character, although in its entire course it is intermittent. The daily variation is seldom less than about 2° F. The period of highest temperature is usually from 9 to 10 a.m., and from 6 to 8 p.m. Sometimes the maximum occurs at from 12 to 3 p.m, The shivering which generally ushers in the attack may be *preceded* by a rise in temperature. The rise from normal to the acme of the attack generally took place in four to eight hours, but might extend over twelve to twenty-four, seldom more. Just before the crisis the temperature rose rapidly, often to the very highest point in the attack, in one case so rapidly as 4° F. in half-an-hour. The defervescence is at first rapid, then slower, occupying on an average eight to nine hours; seldom longer than two days. In cases of a rapid crisis, the cooling averages 1·8° F. per hour, being greatest at first. The average total fall is above 9° F. There is a post-critical rise of 2° to 7° F., which may last two days. This was most marked where the critical fall had been greatest, and may therefore be regarded as an endeavour of the system to return to the normal temperature. During convalescence temporary elevations may be caused by variations in diet and by complications. The normal temperature is sometimes not regained for weeks.

There is nothing in the nature of the crisis, or course of the temperature, or general symptoms, to indicate another attack. During the attack there are always appearances which forerun a crisis—slight perspiration, temperature and pulse tending to fall.

If there is not a rise in temperature reaching, on an average, 102° F., with an exacerbation in its future course to 104° F.; if after the defervescence there is not a subnormal temperature for some hours at least, it is doubtful whether there has been an attack at all. In doubtful cases, a true must be distinguished from an apparent relapse, for which internal causes will account. A true relapse arises simply from the nature of the disease. The duration of the intermission is variable, and therefore the interval preceding the rise of temperature cannot determine the question. If only a few hours after a true crisis the temperature remounts, accompanied by shivering, this is a genuine relapse, provided there has been *a subnormal depression in the interval*; which is an intermission, not a remission.

The number of relapses, like the duration of the attacks and intermissions, follows no regular law. In a case, such as occurred, where the intermission lasted 19 days, the question of self-infection is suggested. In the strong and young, as a rule, the shortest intermission is found; in the weakly and the aged, a lysis and complications were most frequent.

The duration of *convalescence* was in direct relation to the individual circumstances, so that a lysis was generally followed by protracted convalescence. The height of the temperature seemed to have no influence. The entire duration of the disease, from the outset to perfect convalescence, averaged thirty-two to thirty-five days.

The therapeutics of relapsing fever are almost entirely confined to the diminution of the frequently enormous heat, and to the prevention of intercurrent complications. Ice to the head; occasionally also mineral acids; in severe renal affections, citric acid, are of most service. The drinking of water was as far as possible limited, to prevent the diarrhœa which often follows it. Wine or beer was given early.

There is no medicine which will prevent the attack or cut short the disease. Bleeding and emetics were not employed, though opportunity presented itself of judging to some extent of their action. In one case, wet-cupping had been employed on the third day, because, from the great splenic dulness and pain, pneumonia had been diagnosed. The first attack lasted seven days; the second occurred on the eighth day, and lasted five days. Another male, aged 26, was attacked on 1st February, had an emetic on the 2nd, and was admitted on the 3rd. The first attack lasted four days, the subnormal temperature lasted for one day, and then there was a relapse of two days' duration. It is doubtful if the short duration of the fever, six days, was caused by the emetic. One case without treatment had only seven days of fever in two attacks. Another patient took an emetic the day before the crisis of the second attack, and was admitted in a state of perfect collapse. He was revived by powerful restoratives. Next day the temperature fell to 94·8° F., and he had a tedious convalescence. This was the only case of profound collapse observed.

Quinine, as well as digitalis, proved of no essential use. Of the action of digitalis, given in infusion or in powder, it can only be said that during the attack it seemed in a few cases to lower the pulse (108 to 88), but not at the time of the crisis, when it again rose (120 to 132), and that after its administration in the intermission, the pulse in three cases did not rise above 96 in the second attack. But here the variable behaviour of the pulse especially must be remembered, and also the circumstance that in the second attack the pulse very frequently is lower than in the first.

On the action of quinine (given in continuous small doses, and in single and continuous large doses, during the attack, and in the intermission,) a series of observations was instituted, from which it was proved that neither the temperature nor the course of the disease was at all modified.

There is thus, along with considerable resemblance as to external phenomena, a very noteworthy difference between relapsing and remittent fever. Large doses of quinine were, however, very well borne by the patients; only one, who had great repugnance to its taste, vomited shortly after taking it.

Cold Baths,* from 68° to 72° F., and lasting quarter of an hour, were employed with advantage; yet the low mortality is not attributable to their use, since only 20 cases were treated with daily baths all through the disease, and one of these 20 died. The baths act by lowering the heat, and so far are truly beneficial. They might, during the attack, depress the temperature for some hours by 1·8° to 5·4° F. But frequently, after the bath, the temperature very rapidly regained its former height, or even surpassed it. As examples of this, take the following:—A patient, whose temperature was 103·5° F. at 6 a.m., had a bath at 72° F. for quarter of an hour; at 7 a.m., three quarters of an hour thereafter, the temperature had risen to 106·3° F. Another, on the third day of the second attack, got a bath at 68° F. at 7 p.m., when his temperature was 107·4° F; at 7½ p.m. the temperature had fallen to 101·3° F., but in half-an-hour thereafter, at 8 p.m., it had risen to 105·8° F. This rise after the cold bath occurred particularly in the evenings, and shortly before the crisis. Thus, on the seventh day of the first attack, at 6 p.m., a patient had a bath at 68° F., the temperature being 104° F. In half-an-hour it had risen to 106·3° F.; at 8 p.m. it had again fallen to 105° F., and the crisis followed. At the beginning of the crisis, the baths may hasten the fall of the temperature. Thus a bath was given to a patient whose temperature was 106·3° F., and one hour thereafter it was 96° F., a fall of no less than 10° F. This was one of the most sudden crises observed. The different effect of one and the same mode of treatment, cold baths, at different times; the constant acceleration of the defervescence at the crisis, and the slight, often only extremely short, cooling during the attack, serve in a special manner to point to a progressive increased generation of heat while the fever exists, which at the crisis ceases naturally with great suddenness. Baths seem to exercise no sensible influence upon the course of the disease, upon the occurrence of relapse, and especially upon the causes exciting the fever. A case is given in which hourly temperature observations were taken, and the characteristic forenoon and afternoon maxima were not in the least influenced by frequent baths.

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* Accurate observations on the action of cold baths in fever are valuable at present, and hence we give this part of Dr Obermeier's paper more fully. He does not seem to show the slightest unquestionable advantage.—J. B. R.

The *sequelae* seldom require special treatment. The enlargement of the spleen and liver soon disappears of itself, and through time the renal affection also. Suitable, unstimulating, nourishing diet, with preparations of quinine and iron, are of most use in restoring the body to strength, and especially for the removal of the anæmia which is a constant result.

Dr Obermeier has not been able to convince himself that *the blood* during the fever contains more water than in the normal state. In convalescence on the other hand, 10—20 days later, there was a considerably greater fluidity of the blood. As the result of numerous microscopic observations, he denies the accuracy of English authors (Cormack, Thomson), when they assert that the white corpuscles are more numerous.*

The body-weight in relapsing fever possesses very special interest on this account, that in it the same individual, under known conditions as to food, passes through successive febrile and non-febrile periods.

A glance at the tables is enough to show that the body-weight decreases. The law in all the cases is that *during the febrile days of the first attack there is a considerable loss of body-weight, during the intermission, a gain, during the fresh attack, again a loss*, afterwards, a gain, and so on. But the question presents itself, does this loss occur through the special, active febrile process, or through diminished nutrition? Dr Obermeier devotes much space to the study of this question, which resolves itself into a determination, whether the loss of weight in fever is greater than in similar conditions of nutrition without fever. He considers the variations in body-weight with ordinary diet in health, with fever-diet in a healthy person, under the usual circumstances of a fever-patient, especially noting the phenomena caused by the simple transition of a healthy person from full diet in bed, &c., to fever diet in bed, &c. He proves that in fever an equilibrium of body-weight is never maintained under conditions which would have ensured this equilibrium in healthy persons, that the loss of weight in fever differs in kind, manner, and amount, from that in healthy people in approximately similar circumstances; that in fever patients the whole phenomena of loss of weight are inexplicable solely by diminished nutrition. The most remarkable phenomena of body-weight are observed during the crisis. There is first a rapid fall, with perspiration and diarrhœa, then a rapid post-critical rise. This variation must be based on changes in the fluid constituents of the body. Whence does the water originate? There is good reason to believe that water may replace consumed material. It would seem that the organism retains water proportioned to the temporary constitution of its parts, which it may lose, without materially suffering in composition. This water the body may lose in special circumstances by critical or simple diarrhœa, or perspiration. It replaces the lost water very quickly, but with this difference, that, after simple diarrhœa or perspiration, the body regains its former weight in a few days, but not after critical.

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* It will be observed, subsequently, that Dr Pastau also failed to observe any increase of white corpuscles.—J. B. R.

The behaviour of the body in the intermission and in convalescence indicates an exhaustion, a diminution of its constituent elements. The body gains from a diet which ordinarily would not suffice to maintain it. The transformation of material is less active, as is shown by the long-continued subnormal temperature, the slowness of the pulse, and the consequent retardation of the respiratory process.

The following are Dr Obermeier's conclusions, after a long and exhaustive enquiry of great value in its bearings on the fever-process in general, illustrated by tables of analyses and diagrams, giving temperature, weight, and pulse-curves:—

1. In the course of relapsing fever the body loses from 1-5th to 1-10th of its own weight. 2. The daily loss during the fever-period averages 1-50th to 1-100th of the body-weight. 3. The loss of weight in relapsing fever is in great part due to diminished nutrition; but a not inconsiderable proportion is caused by circumstances peculiar to the fever (increased elimination; critical excretion of water). 4. A practical conclusion is that, with due precaution, good strong food should be provided as early as possible. J. B. R.

II. Dr Pastau's paper* appears in two parts, but it is chiefly with the second we have to do. The first is devoted to a historical inquiry into the identity of relapsing fever. Since the great St Petersburgh epidemic of 1865, nothing had been heard of this disease until April, 1868, when it appeared in Breslau. The former epidemic consisted of a simple recurrent and of a "bilious typhoid" fever, which was very fatal, so that the general mortality was 11 per cent., while in Breslau it was only 2·85 per cent. The number of cases treated was 351, of whom 67 per cent. originated in three streets in the low-lying part of the town of Breslau, beside the Oder, where the houses are most wretched, and inhabited by the dregs of the population. The epidemic reached its acme in July and August, and disappeared in December.

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* Die erste Epidemie von Febris recurrens in Schlesien. Von Dr v. Pastau, Sanitätsrath und Dirigenten des städtischen Krankenhauses zu Allerheiligen in Breslau. Virchow's Archiv, 1869, Bd. xlvii., pp. 282 and 487.

The general features of the disease, as observed by Dr Pastau, are the same as those already given from Obermeier's paper. Even the more unusual phenomena, such as icterus, the systolic murmur, &c., seem to have been observed in the same proportion of cases. The remarkable loss of weight is also noted, and precise determinations of it given. In nine instances *post-mortem* examinations were made. No constant conditions were observed. The bodies were generally ill-nourished, destitute of fat; the muscles ill-developed, and deficient in moisture, especially in those who died during the intermission.

Post-mortem appearances.—The changes in the *muscular* fibres bore no direct relation to the symptoms during life. In many cases no lesion was apparent in particular muscles which had been the seat of severe pains; but in other cases either slight granular deposits, or advanced fatty degeneration, were more or less evident in the whole muscular system.

The microscopic examination of the *blood* revealed no abnormality, especially no increase of the white corpuscles.

The *heart* was generally flabby, more or less brittle, easily torn, but usually with only sparse granular deposits. Once, its muscular structure was remarkably thinned, and the *musculi papillares* appeared as soft thin bands.

The *spleen* presented the most constant morbid appearances. In those who died during the attack this body was more or less enlarged, with a smooth, tense capsule. It was partly of firm consistence and dirty brownish red colour, showing, besides unusually distinct trabeculæ, numerous round or irregularly shaped bodies, the size of a hemp-seed, or larger, and of white or yellowish-white colour, and very friable. They might be removed with the point of a needle from the surrounding tissue, exhibited frequently a central softening, and consisted microscopically of small, round, cellular bodies which were partly involved in the degeneration. But this was not a constant condition; sometimes the lymphfollicles of the spleen-substance appeared as numerous greyish-white points as large as a pin head, without those peculiarities. In two of those cases the spleen was pulpy and its structure unrecognizable.

The *liver* also was enlarged in those who died during the fever. The enlargement was due to engorgement; there was no hyperplasia of the areolar tissue or hypertrophy of the cells, which exhibited no constant alteration whatever. In one case there were here and there bodies analogous to those observed in the spleen. In a case which died during the intermission, the liver was normal. Icterus occurred in two fatal cases. It originated in a catarrh of the intestinal portion of the bile-duct, set up by an intense catarrh of the duodenum at its point of entrance into the bowel. The gall-bladder and duct were distended with bile. The stomach and bowels showed no constant lesion. The mucous membrane was sometimes much injected. Often also the solitary glands of the ileum were enlarged to the size of hemp seeds, and then the mesenteric glands were also distinctly swollen, especially near the cœcum. Diarrhœa had always existed in such cases.

The *kidneys* were, like the other organs, much congested in cases fatal during the febrile stage. Frequently the cortical substance was very soft, and the malpighian tufts appeared as red, distinctly projecting points. Sometimes cloudy swelling of the epithelium in the convoluted tubes was observed.

There was usually little or no fluid in the serous cavities; and the other organs and parts not specified presented no change.

Dr Pastau enters into a minute analysis of the *symptomatology* of his cases, from which we make only a few notes. The highest temperature noted in the first attack was 108·3° F. The greatest critical fall amounted to 12·6° F. The lowest point reached in the intermission was 93·2° F. In the second attack, the highest temperature observed was 108·6° F., and in general the temperature was higher in the second than in the first attack. The greatest second critical fall observed was 14·4° F. The temperature in third attacks was moderate compared with the preceding, and the critical fall was proportionately less. Muscular pains are one of the most prominent symptoms. In a number of cases the patients suffered from excessive pain at the nape, and great tenderness on pressure over the cervical spinous processes. In one case this pain was the most prominent symptom, felt without pressure, and causing the patient to cry out on the slightest movement of the head. In another class of cases, pains in the loins were observed.

Dr Pastau's analyses of urine, in view of the more complete paper which follows, may be passed over.

Complications and sequelae.—Pulmonary complications, beyond slight bronchial irritation, were rare. Gangrene of prepuce; an eruption of bullae, accompanied with fever; boils; and herpes labialis occurred in individual cases.

Therapeutics.—The entire treatment is summed up in rest, cleanliness, fresh air, and good food. Active treatment for special symptoms during convalescence may be beneficial, but any attempt to modify the natural course of the disease is fruitless. Milk and beef-tea were given, and where digestion was good, light digestible animal food, wine and beer. When the fever rose high a mineral acid, usually phosphoric, was administered. Ice was applied for the headache and giddiness. Effervescing drinks were given for thirst. Diarrhœa seldom required treatment. Neither quinine nor arsenic manifested any influence on the course of the disease. Iron and quinine combined is often of very great value, especially where there is anæmia.—J. B. R.

III. The results published in this paper* are derived from thirteen cases in which the urine was analyzed. Five of the cases have been selected, and the determinations given in full. In all, the quantity of urea was determined, in many, also the phosphoric acid, and in some the chloride of sodium. The temperature, taken morning and evening, and sometimes at mid-day is also given. After tabular details of the five selected cases, general conclusions are deduced.

The *chlorides* were observed, as in other febrile states, to diminish towards the height of the fever, almost to complete disappearance.

The most important results are derived from the determination of the *urea*. During the first paroxysm, the amount of urea was always increased, and this increase continued beyond the crisis. No distinct parallel can be drawn between the temperature and the amount of urea excreted;

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* Harnanalysen bei Febris recurrens. Von. E. Riesenfeld, stud. med. in Berlin. Virchow's Archiv. 1869. Bd. xlvii. p. 130.

in particular, long after the temperature had sunk, the urea remained high. Various explanations of this fact might suggest themselves. It might be supposed that the increased amount of food which is taken as the fever subsides, would cause an increase in the urea. But if this were the cause, the amount of urea excreted should increase as the nourishment taken increases; on the contrary, the urea gradually, though much more slowly than the fall of the temperature, decreases, proving that the continuance of the high rate of excretion past the crisis depends on the previous febrile condition, and not on the diet. Further, it cannot depend on a continuance of increased tissue-change, as this would be shown by a continuance of the elevated temperature. Nor can it arise from an increased supply of water, for the urea bears no definite relation to the amount of water in the urine. The only probable explanation is that the products of the increased tissue-metamorphosis during the previous febrile state were to some extent retained, and excreted after the fever was gone. C. Voit has shown that urea differs from chloride of sodium, in that while the latter may be retained in the system, the former can only to a very small extent be so retained. In the present case, therefore, either this law must be suspended, or, as is much more probable, the retained products exist not as urea, but the principles from which urea is derived. This is supported by the fact that kreatin and kreatinin are more abundant in febrile urine than usual.

At the beginning of the second paroxysm, the patient is in a somewhat different condition from the beginning of the first. He walks about, takes his diet, and does not feel ill till some days after the commencement of the attack. Again, at the commencement of the first attack, the stock of albumen in the tissues is much larger than in the second, for in the former case, besides the albumen-proper of the tissues *(organeiweiss)*, there is a store of albumen laid up *(vorrathseiweiss)*. On the contrary, at the outset of the second attack, the body will hardly have recovered its equilibrium of nutrition after the great expenditure during the first attack. It is not to be expected, therefore, that the increase of urea will reach such a height during the second attack as during the first, and the cases show this difference. A distinct increase in the urea during the second attack is, however, undoubtedly present. In only one case was there no such increase; but this solitary exception can be explained by supposing that the first attack had so exhausted the allowance that it could not be supplied during the intermission.

These cases show that during relapsing fever there is really an increased oxydation of the nitrogenous tissues. It is now acknowledged that the strongest bodily exertions do not increase the amount of albumen used, so that this increase in fever does not represent an increased amount of labour performed by the organism. It has been supposed that this increased consumption of tissue is characteristic of fever. In diabetes there is increased excretion of urea without fever, but this can be accounted for by the large increase of food used.

Phosphoric acid was excreted in these cases in quantities parallel to those of urea. This is to be expected from the fact that the phosphates exist in the body in intimate union with nitrogenous tissues, and by their increased combustion phosphoric acid and urea will be simultaneously increased. The increase of phosphoric acid bears no such relation to the amount of water in the urine, as Rosenstein has tried to establish for exanthematic typhus. The amount of phosphoric acid is usually higher in the second attack than in the first. Bischoff has shown that in hunger the amount of phosphoric acid in the urine is increased, and its increase in fever might be ascribed to the state of inanition, especially as it is greater in the second attack, where also the inanition is greater. But Bischoff further says that the increase of phosphoric acid in the urine probably arises from the plasma without a corresponding destruction of albumen; being accompanied by an increase of common salt, and other inorganic salts. In fever, on the other hand, there is increased consumption of albumen, and a decrease of common salt, so that it is very questionable whether the increased phosphoric acid arises from the plasma, and not rather from the combustion of nitrogenous tissue, this being the common source of it and the urea. The author supposes that the presence of phosphoric acid in the blood may have some share in producing the muscular pains so common in relapsing fever, in addition to the uric and lactic acids, mentioned by Murchison as the probable cause of these pains.—J. C.

Reviews.

I.—Ueber Sympathische Gesichts-störungen, *von* Dr med. Albert Mooren, *dirigirendem Arzt der städtischen Augenklinik zu Dusseldorf*, pp. 170. Berlin: Hirschwald. 1869.

On Sympathetic Inflammation of the Eye. *By* Dr Albert Mooren.

Dr Mooren is known as the author of a method of operating for cataract by means of a preliminary iridectomy, and published a volume of ophthalmiatric observations in 1867, in which the subject of the present monograph was pretty fully treated. The author's object in reproducing and extending his observations on sympathetic inflammation of the eye is, by taking advantage of the increasing number of facts, to give a more precise and systematic view of the whole subject,—such as may be of use, not merely to the oculist, but also to the medical jurist and military surgeon. The author's sphere of activity (Dusseldorf) happens to lie in a part of Germany which, from its industrial character, presents an unusual amount of material for clinical observation of a disease to which he appears, from various causes, to have devoted a great deal of attention.

Sympathetic inflammation of the eye is a disease of great importance, and of very frequent occurrence. Dr Mooren's extensive observations, based as they are on more than 40,000 cases, and his intimate acquaintance with the literature of the subject, entitle his views to the highest consideration. We therefore purpose to give a brief analysis of the principal points connected with the diagnosis and treatment of this very obstinate disease, referring those who are interested in the subject to the work itself for the facts and arguments adduced in support of his conclusions.

The first chapter gives a historical account of the gradual recognition of sympathetic inflammation of the eye as a distinct disease, that is to say, an inflammation of a hitherto sound eye in consequence of destructive inflammation or injury of the other. Isolated cases of this disease had been observed and recorded by Bartholinus, Bidloo, Brondeau, and Demours; but it is only in very recent times that it has been described as a separate disease. It is gratifying to find a well-deserved tribute paid to the sagacity of the late Dr M'Kenzie, who was the first to describe a sympathetic iritis and its very obstinate character.

> "In fact, Dr M'Kenzie was the first who, already in 1844, could speak of the existence of a sympathetic iritis. This important disease appears to have been known for many years to the celebrated Glasgow oculist, as is irrefutably demonstrated by the communication of an observation made on the 31st January, 1827. The words of the author, 'Whenever I see a sympathetic ophthalmitis, even in its first stage, I know I have to contend with an affection which, however slight its present symptoms may be, is one of the most dangerous inflammations to which the organ of vision is exposed,' bear testimony to the extent of his knowledge; and the number of minute remarks on the nature of the course of the disease confirms the truth of the observation. The import of these facts is sufficient to insure the fame of the celebrated Scottish surgeon, for it was he who gave an impulse to the observation of a disease which, previously unrecognised in its cause and unheeded in its course, as a rule first began to attract the notice of the physician and patient when approaching blindness, the closing link in the series of insidious symptoms, made its appearance." (p. 5.)

Ten years later, Mr White Cooper having demonstrated the frequent occurrence of sympathetic inflammation in the form of choroido-iritis, when the first eye was destroyed through laceration of the sclerotic, and finding the utter hopelessness of arresting the disease by the ordinary treatment, proposed enucleation of the primarily affected eye when the second was attacked with inflammation. About the same time, Pritchard of Bristol published in the *Association Medical Journal* the results of twenty cases treated as Cooper had recommended. He urged strongly the necessity of enucleating the diseased eye as soon as symptoms of inflammation made their appearance in the sound eye. In 1855, R. Taylor, on the supposition that the disease originated in the anterior part of the eyeball, not merely from injury, but also from idiopathic inflammation and destruction of this part, rejected enucleation, and proposed removal of the anterior part of the organ. It is remarkable that in spite of these important facts, so late as 1850 there is scarcely any notice taken in text-books of the probable origin of this affection. Wharton Jones in 1855 placed the starting point of the disease justly in inflammation of the ciliary body; he treats it, however, rather superficially, although he appears to have known the fact for many years.

This question was not overlooked in Germany; and to Von Graefe belongs the merit of having demonstrated that sympathetic inflammation originated in inflammation of the ciliary body of the eye primarily affected, and chiefly in this, that he succeeded in giving to the hitherto doubtful symptoms of cyclitis a more definite character; and it was pointed out by him more decidedly than any of his predecessors, that this form of inflammation was also the starting point of the sympathetic disturbance. It is impossible to over-estimate the importance of this point, because now for the first time a basis was laid for future investigators, and a point of view found, from which the true course of the disease could be traced.

What, then, are the symptoms of cyclitis? Various authors, from 1830 onwards, had described an inflammation of the ciliary body, but many of the symptoms given were clearly those of other diseases, and authorities began to doubt the possibility of distinguishing a case of simple uncomplicated cyclitis. In the beginning of 1856 Von Graefe showed that a sudden turbidity of the vitreous was a constant and infallible symptom, and shortly afterwards confirmed this view by demonstrating the extreme sensibility of the inflamed ciliary body on pressure. One of the earliest symptoms of cyclitis is a strongly marked circumcorneal injection, accompanied by photophobia and lacrymation. In doubtful cases, and in the early stage of the disease, Von Graefe touches the ciliary region all round with a myrtle leaf, and if this causes pain at any point, there is no symptom more certain and infallible. These symptoms are soon followed by deepening of the anterior chamber, from retraction of the iris, and sometimes by hypopion. The health of the patient suffers, and there are frequently violent neuralgia and deafness on the same side as the affected eye. One or more of these symptoms may predominate, but under whatever form it appears, *pain on pressure in the ciliary region, and the presence of turbidity of the vitreous humour, are constant symptoms.* Pain produced by long continued accommodation for near or fine objects is a frequent but not by any means a reliable symptom. As the disease approaches its acme, and even before, there is a marked diminution of the acuteness of vision, partly from chemical changes in the aqueous, but chiefly from the turbid condition of the vitreous, which shows itself at one time in the form of clouds, at another in denser moving flakes, and occupying the anterior part of the chamber. With the failure of health there is more or less acute feverishness, generally in the form of gastric irritation. Cyclitis, whether it be of spontaneous or traumatic origin, is incontestibly one of the most dangerous inflammations of the eye, for, apart altogether from the importance of the ciliary body in itself, the insignificant and unheeded beginning of the disease becomes a fruitful source of future dangers.

As regards the treatment, the fact that every act of accommodation of the sound eye excites pain in the diseased eye would indicate the propriety of closing the former. After the instillation of atropine (0·05 atrop. sulph.: 10·00 aquae destill.) the diseased eye should be covered with a warm bread poultice, with or without the addition of narcotics, as hyosciamus, conium, or poppy heads. Heat being the chief agent, they must be changed when the patient complains of cold. If there is much injection, leeches should be applied. Next to the use of atropine, which quiets the action of the secretory nerves of the eye, in the early stages of the disease, great benefit is derived from the subcutaneous injection of morphia at night, repeated during the day if necessary. If the pain assumes a typical character, large doses of quinine should be given. Should it not intermit, mag. sulph. c. potass. nit. are preferred. When there is gastric irritation, appropriate remedies should be administered, *e.g.*, sodæ carb., or acids, as the case may require. If there is an increase of the aqueous humour diuretics and derivatives may be given. In all cases operative interference is to be avoided. When it is absolutely necessary, as in hypopion, simple puncture of the anterior chamber is sufficient. The uncertainty of iridectomy, and the dangerous consequences which sometimes follow, render it inapplicable. The above treatment, *i.e.*, chiefly sedative, is on the whole successful, for on the subsidence of the pain, the other symptoms quickly yield.

In Section III. there is a list given of 240 different diseases, (including all those occurring in above 11,000 patients, seen from the 15th October, 1866, to the 14th April, 1869,) which may directly or indirectly set up inflammatory processes ultimately ending in sympathetic inflammation. The author has never seen simple, uncomplicated inflammation of the ciliary body followed by sympathetic reaction. In considering the causes which lead to sympathetic inflammation, the anatomical relations of the ciliary body to the iris and choroid will readily explain how, in intense or even quiescent forms of cyclitis, the inflammation may extend suddenly in either direction. So, also, on the other hand, in whatever part of the uveal tract it originates, inflammation may, by its extension, involve the ciliary body. If there is a more or less complete posterior synechia, we have the irido-choroiditis of Von Graefe. If this disease exists in both eyes, the access of cyclitis in one eye increases immensely the danger of sympathetic inflammation, which generally ends in complete destruction of both. Of the causes which may set up an inflammation of the ciliary body; iridectomy for choroiditis; syphilitic iritis; prolapsus of the iris, by extension of the inflammation; the operation of iridodesis; separation of the retina; reclination of the lens in cataract; wounds of the ciliary body; wounds of the sclerotic, and atrophy of the eyeball, are the most frequent. The general conclusion of the author is, "that every inflammation in the course of the uveal tract, however unconnected with its original cause, acquires the capacity to originate sympathetic inflammation, whether it makes its appearance, *a priori*, as cyclitis, or in the course of time takes on this character." (p. 58.)

The earliest symptom of sympathetic disease, under whatever form it may manifest itself, is a sudden fatigue of the accommodation. Every attempt to look at small objects for a length of time is quickly followed by lacrymation, and injection of the blood vessels of the ball. Should the exertion of the vision be prolonged there is also frontal headache, and increased injection of the primarily affected eye. This increased injection aggravates the inflammation of the ciliary body, which, in turn, diminishes still more the range of accommodation of the sympathetically affected eye, so that this disturbance of the accommodation, by action and reaction, becomes both a cause and an effect. Partly connected with the derangement of the accommodation, and partly from the disturbance of the circulation in the uveal tract, indicated by the pericorneal injection, objects appear hazy, and the acuteness of vision is diminished. Frequently, without perceptible cause, the pericorneal injection increases, the aqueous becomes turbid, and the iris discoloured. The discolouration of the iris is more hyperæmic than inflammatory; rarely accompanied with pain; and is generally the forerunner of inevitable blindness. This hyperæmic condition may retrograde, only to return with renewed strength; the pupillary dilatation, at first considerable, diminishes; the anterior chamber deepens; the vessels of the iris increase in calibre; there are, in short, the symptoms of cyclitis, as formerly noticed, with this distinction, that the retraction of the iris periphery is combined with a glueing of the whole surface of the iris to the anterior capsule of the lens: at the same time circular synechia of increasing breadth makes its appearance, initiating that series of disturbances of the circulation so characteristic of irido-choroiditis. It might be said that this form of iritis, in so far as it is connected with cyclitis, does not materially differ from the usual forms of the disease, and this is so far true; but there is one characteristic symptom of the sympathetic affection, viz., the changed secretion of the aqueous, which originates in the tissue of the iris plastic exudations which, extending to the ciliary body, bind indelibly the two structures together. In other instances the iris is pressed forward upon the inner surface of the cornea with an increase of intraocular pressure, giving the disease a glaucomatous character. Partly attending and partly without any connection with these symptoms, hypopion makes its appearance, sometimes filling one-third of the anterior chamber, and may continue for months before being finally absorbed.

Sympathetic inflammation having once reached its height, the preservation of the eye is out of the question. This form of the disease above described, on account of its severity, ought perhaps to be regarded as the type, but there are many modifications, as we shall see, which, however, have this in common, that they all lead to the destruction of the affected eye. During the author's professional life, 52 distinct cases of sympathetic amaurosis, through the interference of a fully developed cyclitis in the primarily affected eye, could be demonstrated. A table is given, in which the exciting cause and the relative number of cases under each is recorded. 20 cases, which were seen between the 15th of October, 1856, and the 14th of October, 1866, exhibited more or less sympathetic disturbance, without the amaurosis of the primarily affected eye leading to destruction of the vision of the second. The cases are given in two parallel columns; the primary disease in the first, and the sympathetic in the second. This is followed by a list of 40 cases, seen from the 15th October, 1866, to the 14th April, 1869, arranged in two parallel columns, in which the primary disease, with concomitant amaurosis, was followed by sympathetic disturbance without amaurosis. The first column contains a description of the disease and the treatment, the second gives the sympathetic form, and the results of the treatment. These cases occurred among 11,688 patients, seen during a period of little less than three years. The greater number were treated by excision of the primarily affected eye, and all successfully. Altogether they give a very complete clinical representation of the disease, and display in a remarkable degree the painstaking and accurate method of investigation of the author. The conclusion, drawn from a careful analysis of the cases given, is, that the primary disease must have reached a certain height, or have existed for a certain period, before it is capable of exciting sympathetic inflammation of the second eye. He thinks it was no mere accident that, among all these cases where the second eye was sympathetically affected or threatened, the primarily affected eye was completely amaurotic. He does not, however, deny the possibility of a sympathetic affection beginning before the occurrence of amaurosis in the primarily affected eye, but those exceptions would but slightly affect the general conclusion. The former view receives some support from the fact that among 17 cases of cataract operated on by reclination which ultimately went wrong,—all had given rise to more or less sympathetic disturbance, seven of these ending in amaurosis, whilst in the ten remaining with more or less sympathetic disturbance, there was only one in which the existence of secretion-neurosis could be detected. In these last cases it can only be surmised that the lens was resorbed, or that the treatment had checked the inflammation in the primarily affected eye before symptoms of sympathetic disease were fully developed.

The different forms of sympathetic inflammation, from a simple iritis to a consecutive glaucoma, render it absolutely necessary to consider the height and duration of the primary disease, in judging of its influence in producing any of the intermediate forms of the secondary affections. And when it is stated that an interval of from a few months up to 30 years may elapse before sympathetic symptoms make their appearance, the prognosis, as regards the results of any disease or injury likely to lead to sympathetic disturbance in any given case, must always be doubtful.

The mode of development of sympathetic iritis was supposed by Dr M'Kenzie to be by direct communication, through the intervention of the optic nerve, from retina to retina, and this opinion has been very generally held. Dr M'Kenzie was too good an observer, and had seen too many instances of pernicious iritis, not to take into account the influence of the blood-vessels and ciliary nerves. He says:—

> "It is not improbable that the blood-vessels on the side of the injured eye, being in a state of congestion, which attends inflammation, communicate to those of the opposite side, with which they have connections within the cranium, a disposition to the same state in which they themselves are. The ciliary nerves also, of the injured eye, may be the means of conveying to the third and fifth nerves an irritation which may be reflected from the brain to the same nerves on the opposite side. I think, however, that the chief medium through which the sympathetic ophthalmitis is excited is the union of the optic nerves. It is extremely probable that the retina of the injured eye is in a state of inflammation, which is propagated along the

corresponding optic nerve to the chiasma, and that thence the irritation, which gives rise to inflammation, is reflected to the retina of the opposite eye, along its optic nerve."—(4th Ed., p. 619.)

This view has generally prevailed, for the proposition laid down earlier by Tavignot, namely, that the secondary affection is simply a ciliary neuralgia, scarcely attracted any notice, and was soon forgotten. H. Müller in 1858 laid stress on the co-operation of the ciliary nerves, without, however, rejecting the participation of the optic nerve. In order to arrive at definite results, Donders and Dr Maats made a series of experiments on rabbits and dogs. Various kinds of wounds and injuries of the eye were inflicted, but in all the cases the results were negative.

The author, however, reverts to pathological facts, and from these he concludes that in each case of cyclitis, whether of spontaneous or traumatic origin, followed by inflammation of the uveal tract, a more or less enduring inflammation of the ciliary nerves is maintained. This inflammation of the branches of the trigeminus is the first and most essential condition for the propagation of a sympathetic inflammation. The intimate connection of the fifth nerve with the sympathetic will readily account for disturbances of the circulation, nutrition, and function of the parts to which it is distributed. There is also a constant and intimate connection between the fifth and the optic nerves, as shown by pathological facts, which sufficiently explains the transfer of irritations of the optic nerve to the fifth; and conversely irritation of the latter may be transferred to the former. "Many obscure points have been cleared up respecting the pathology of sympathetic affections. Much remains to be done on the part of physiologists and ophthalmologists before even a partial solution of the Gordian knot is effected."

Every kind of treatment having failed to arrest a well-developed sympathetic inflammation, complete destruction of the primarily affected eye by caustics was proposed by M'Kenzie, following Wardrope, who, since 1819, had applied them with advantage in veterinary medicine. In conformity with the views then held, that all cases of sympathetic disease were of traumatic origin, or from the presence of a foreign body in the eye, others proposed to lay open the eyeball, partly to relieve tension, and partly to facilitate the removal of the foreign body, and thereby reduce the inflammation, and consequently the danger of sympathetic reaction. As already stated, Pritchard urged strongly excision of the diseased eye, on the principle that the optic nerve was the chief means of communicating the sympathetic disturbance. As H. Müller's researches seemed to point out the ciliary nerves as the medium of communication, Von Graefe proposed and carried out the plan of introducing setons into the primarily diseased eye, in order to induce suppuration and destruction of the branches of the ciliary nerves. Atrophy of the eyeball generally followed, but atrophy from whatever cause is one of the most frequent precursors of sympathetic ophthalmia; so that, apart from the injurious influences which might be communicated to the sympathetically affected eye by exciting strong inflammation in the other for some weeks, this treatment could not be considered radical; indeed, the author has had occasion to remove more than once the highly sensitive stump. A second proposal of Von Graefe was to cut the opticus stem in the orbit, and at the same time the attendant ciliary nerves. This operation does not appear to have afforded permanent relief, and recently he has proposed section of the ciliary nerves through the sclerotic, at the most sensitive part of the ciliary body. It appears to be applicable only to the slighter forms of the affection, and in all cases of malignant iritis or irido-cyclitis recourse must be had to excision. The temporary effect of neurotomy either through the sclerotic, or deep in the orbit, is probably due in part to some of the affected branches remaining uncut, and also to the reunion of the cut branches. Moreover, it is agreed on all hands that the presence of intra-ocular inflammatory products may cause irritation of branches of the ciliary nerves, and thus increase the danger of exciting the sympathetic inflammation. On the whole, then, the author concludes that excision, by removing every possible source of irritation, must always hold its place as the most certain in its results.

That enucleation is at once a safe and efficacious measure the following facts prove:—Out of 55 cases which, in the course of the last two and a half years the author operated on for sympathetic disease, there was not one in which the disease reappeared. In all these cases the primarily affected eye was amaurotic before it was determined to enucleate. A table is given enumerating the different causes which led to the amaurosis, and the relative number in each,—atrophy of the ball, choroiditis ectatica, irido-cyclitis, and injury of the ciliary body, were the most frequent. It is just possible that some of the cases might not have gone on to complete destruction of the vision of the sympathetically affected eye; but, on the other hand, there were many in which the premonitory symptoms of a threatened inflammation were present, and its sudden entrance was to be expected, such as diminution of the acuteness, and contraction of the field, of vision, &c. In all these cases the operation obviated not merely the danger of a genuine outbreak, but also quickly and effectually removed the equivocal symptoms of sympathetic affection. The grounds on which the treatment was founded, and the indications which demanded it, were given in the *Ophthalmiatrische Beobachtungen* (p. 151), and are here reproduced. Among 55 cases operated on, in 6 the sympathetic inflammation had gone so far, that an iridectomy had to be performed on the remaining eye in order to restore the vision. Enucleation, then, sufficiently early performed proves a certain preventative of sympathetic inflammation, and has a decided effect when the disease has reached a certain point, but in the latter case with the exception of secretion-neurosis which always passes off quickly after excision, the recovery is very slow and the results not at all satisfactory.

So far Dr Mooren. We have merely to add, by way of comment, that, in this country at least, pernicious iritis is not by any means a common disease. For out of more than 20,000 cases of eye disease, having a proportionate number of injuries and diseases which are said to lead directly to sympathetic inflammation, only four presented symptoms of a malignant type; two were traumatic and two spontaneous. In one of each class, operative interference by excision had only a temporary effect in arresting the sympathetic disease, probably from having been too long deferred. If the premonitory symptoms of pernicious iritis can be relied upon, there can be no question about the propriety of early excision. If, on the other hand, it be admitted, and it might easily be proved, that between simple iritation and pernicious iritis there are many intermediate forms where the vision of the primarily affected eye may or may not be lost, which end in more or less impairment of vision of the sympathetically affected eye; and if in those cases, as was hinted in a review of Soelberg Wells in a previous number of this *Journal*, excision rather aggravates the sympathetic disease, the question of enucleation must be doubtful.

We quite agree with the author, that irritation of the extremities of the ciliary nerves, from whatever cause, is the most frequent source of sympathetic inflammation; but that this irritation is a natural consequence of certain diseases and injuries of the eye is not quite so evident. Out of an immense number of cases of prolapsus of the iris, iritis, squashing of the eyeball, and even foreign bodies in the eye, when the cases were properly treated, and the inflammatory symptoms subdued, we have never seen the slightest symptoms of sympathetic disease. Indeed, fragments of iron may remain imbedded in the eye for months, and finally make their way to the surface, without a single symptom of primary or secondary disease. The probability of sympathetic inflammation in any given case will depend very much upon the state of the constitution of the patient, and the character of the primary affection, and in the case of wounds, the manner in which they heal up. No doubt the simple and safe operation of enucleation, by removing all possible sources of sympathetic irritation, most effectually cuts the Gordian knot. But enucleation always leaves a very great deformity behind, which an artificial eye, in the absence of a moveable stump, very imperfectly hides, and sometimes becomes itself a source of irritation.

As regards the pathogenesis of sympathetic inflammation, we believe that the fact of the iris and ciliary body being originally enveloped in a reflection of the retina; and the probability that the suspensory ligament, the pillars of the iris, and even Descemet's membrane are continuous with, and originally developed from, the connective tissue of the retina, might elucidate some of the obscure points respecting the connection between plastic iritis and secretion neurosis.

II.—1.—FORTIETH ANNUAL REPORT OF THE GENERAL HOSPITAL AND DISPENSARY FOR SICK CHILDREN. Manchester. 1869.
2. SEVENTEENTH ANNUAL REPORT OF THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET. London. 1869.
3. THIRTEENTH ANNUAL REPORT OF THE CLINICAL HOSPITAL AND DISPENSARY FOR CHILDREN. Manchester. 1869.
4. TENTH ANNUAL REPORT OF THE ROYAL EDINBURGH HOSPITAL FOR SICK CHILDREN. Edinburgh. 1869.
5. EIGHTH REPORT OF THE BIRMINGHAM AND MIDLAND FREE HOSPITAL FOR SICK CHILDREN. Birmingham. 1869.
6. THIRD REPORT OF THE BRISTOL HOSPITAL FOR SICK CHILDREN. Bristol. 1869.

AS the above reports are designed mainly for the public, they cannot be expected to add much to our knowledge of children's diseases. It is pleasant, however, to reflect that they indicate the existence of records which, in the hands of those familiar with them, may some day prove valuable. Still, in an age which directs its sceptical criticism to facts very much in proportion to the readiness with which they have been hitherto received, it is satisfactory to find, from time to time, numerical confirmation of doctrines which we may have been taught, or at which we may ourselves have arrived, on the ground of our personal, although it may be somewhat limited, experience.

The above reports are not, of course, framed on the same model, and some contain many more medical details than others. The two last on the list contain little information as to their out-patients. The differences, in character, of the statistics, while preventing proper comparisons in some cases, have the advantage, in other respects, of supplying further details. As the following statements refer to the out-patients treated at the dispensary departments, (over 40,000 cases in the aggregate), they refer to diseases unaffected by medical selection.

Diarrhœa figures largely in all the returns. It constitutes nearly one-fifth of the whole number of cases in most of the reports. Five-sixths of the patients so affected were under two years of age,—from 12 to 18 months being, apparently, the culminating point. The influence of age is thus most obvious. The time of year is scarcely less potent in its influence. The number of cases in the four months from June to September is nearly double that of the other eight months taken together. The transitions, judged from month to month, are, of course, even greater. The mortality is considerable; about 6 per cent. of the cases proving fatal. The deaths probably nearly all occurred in children under two years.

Bronchitis, like Diarrhœa, varies much according to the season of the year, although both are constantly present. The variation in the number of cases of Bronchitis from month to month is, however, much less marked than in the case of Diarrhœa.

Rickets figures largely in some of the reports. In the Great Ormond Street Hospital it forms no less than 11 per cent. of the cases treated. The Manchester reports give 3·3 and 1·6 per cent.; that for Edinburgh states 1·2 per cent. This great difference in the London returns would seem to be due to the larger area from which, no doubt, the Great Ormond Street Hospital draws its patients, who, in the case of chronic affections of obvious character, tend to be drafted in undue proportion to any celebrated institution which undertakes their treatment. Such is the only explanation we can afford of the discrepancy, and it seems to correspond with an almost equally striking diminution in the relative number of diarrhœa patients at that hospital. The acuter forms of disease in poor children may perhaps be treated at neighbouring hospitals or by druggists, while the more chronic are apt to swell the returns of the Children's Hospital. Of course it is very possible that rickets is somewhat more prevalent in London than in other parts of England, just as in Scotland and Ireland it is so much rarer. The great bulk of cases of rickets (60 to 65 per cent.) came under notice before the age of two years; a few are noted as presenting signs of this disease as early as three months.

Atrophy comprehends a large number of cases. By this name is meant a condition of wasting, without evidence or probability of tubercular disease or any similar affection. It depends mainly on want of breast-milk, on improper feeding, bad air, uncleanliness, and perhaps in some cases, systematic drugging with gin and opium. It is largely fatal, owing, doubtless, to the advanced stage of the disease before treatment is sought, and to the persistence of the causes which induced the disease. Like rickets, it is a disease which may fairly be classed as almost perfectly "preventible." The Edinburgh report states only two cases out of 3544 dispensary patients as being due to "atrophy, debility, neglect, improper feeding, want of breast milk, &c.," which seems a very happy state of matters for Edinburgh infants. We were prepared to find some improvement in the Edinburgh report as compared with those of the English manufacturing districts,—where the mothers of large families seem to think that they are not fulfilling their destiny unless they are at work in the mills within a few weeks, or even days, after their confinement,—but this great disparity must surely be due to some difference in the ideas or nomenclature of the physicians.

Chorea would seem to reach its maximum frequency about the age of 9 or 10 years. The influence of sex is well marked,—32 males as against 65 females.

Syphilis, of course, is frequently seen, and constitutes from 15 to 20 per 1000 of the cases. Its mortality is very considerable; about 16 or 17 per cent. of the cases succumb. Most of the patients are under six months.

The various reports indicate differences, perhaps, as great in the physicians as in the patients of the hospitals. In the Edinburgh report we find a disease, "*Infantile Fever*," charged with 14 cases, this being in addition to the various forms of continued fever and febricula. We presume it is a variation of the "Infantile Remittent," which we are happy to say we have searched for in vain in the other reports.

Heart disease varies more in the reports than it is at all likely to do in reality, while the diagnosis of *Teething* is obviously due more to the ideas, and perhaps the care of the physicians, than to the state of dentition in the child. The following figures are curious in this point of view:—

HEART DISEASE.

(Apart from malformation.)

Great Ormond St., London, - -	42	cases,	or	2·77	per	1000.
General Hospital, Manchester, -	21	"	"	2·95	"	"
Clinical Hospital, Do., -	15	"	"	5·27	"	"
Children's Hospital, Edinburgh,	6	"	"	1.69	"	"

TEETHING.

Great Ormond St., London, - -	64	cases,	or	4·22	per	1000.
General Hospital, Manchester, -	14	"	"	1·97	"	"
Clinical Hospital, Do., -	2	"	"	0·70	"	"
Children's Hospital, Edinburgh,	7	"	"	1·97	"	"

The detection of organic disease of the heart in children is often a matter of surprise to the physician in the course of his physical examination of the chest, and is not now thought to be so rare as was formerly stated. We believe it would figure more largely in the reports if the chest were carefully examined in all cases.

Teething, so commonly accused as the cause of so many diseases, and of not a few of the deaths of children, does not figure largely even in the report which states the largest proportion. Of course, the majority of cases are marked as occurring between 12 and 18 months. 64 cases of teething are reported in Great Ormond Street out of 15,143 cases; 60 of these occurred under 2 years of age. Of children under 2 years there were 7219, so that the proportion of cases marked "teething" amounts to 8·3 per thousand of children within the teething period. The immense number of children seen at this hospital may perhaps account for its proportion being somewhat higher than at the other institutions, where the numbers are less. In the hurry of prescribing for a roomful of children, when an infant does not seem very ill, the temptation to diagnose the illness as "teething" without further trouble, is, we all know, very great. But accepting this proportion of about 8 *cases per thousand of sick children under two years, as being due to dentition,* we have surely a striking contrast to the recklessness with which infantile disease is so generally and readily ascribed to teething. Nor is it to be supposed that cases regarded as being due to this cause are not brought to children's hospitals. In the case of children at this time of life, nearly all diseases,—except some obviously surgical cases,—are referred by the attendants to dentition, while the fact that advice can be obtained gratuitously, favours the bringing of children with even very trivial ailments.

Those who have seen but little of children are only too apt to take refuge in the diagnosis of "teething," from the multitude of infantile disturbances of which they feel that they know so little; but if, remembering that when they have put down to teething one case out of a hundred infants brought under their notice, they have already exceeded the proportion seen at Great Ormond Street, they would set themselves to find out the real cause of the illness in the other ninety-nine, we are persuaded they would gain much in their knowledge of infantile disorders, although we confess they might lose popularity with the mothers and nurses. Many mothers prefer very much to have an illness ascribed to "the teeth," rather than to have any reflections made on the quality of their milk, or on the feeding and general management of their infants.

III.—The Pathology and Treatment of Stricture of the Urethra and Urinary Fistulæ. *By* Sir Henry Thompson, F.R.C.S., &c., &c. Third Edition. pp. 336. London: Churchill. 1869.

Laying down rules for the passing of instruments through the urethra, in his "Clinical Lectures on the Diseases of the Urinary Organs," Sir Henry Thompson, says:—

> "Now it may appear to you very heterodox, but I advise you, in passing an instrument, forget all about the different regions. Think nothing about the deep fascia, the membranous portion, or the compressor urethræ. A solid instrument is especially dangerous in the hands of an anatomist; he will push it the way he thinks right, as if all urethras were exactly of the same form, and did not vary as much as noses do, or other features. This used to be the pretext for preferring the solid instrument: it was said, 'You want to know exactly your anatomy, and pass the instrument accordingly.' I pity the patient who has a solid instrument thrust into his body by a knowing man at anatomy."

Writing on the same subject, the same author, in the work presently under review, tells us

> "A clear apprehension of the anatomical relations of the part is ever to be present, so that the course of the canal with its adjuncts may appear correctly pictured and realised by the mind's eye, in spite of the structures which intervene. Too assiduously or too patiently we cannot study the anatomy of the pelvis and urinary organs in order to attain that intimate knowledge of them, the possession of which is necessary to a good operator; but at the same time will never make one."

We prefer to believe the latter of these two very irreconcileable opinions, and are, therefore, not sorry to find the introductory chapter of the work before us devoted to the anatomy and physiology of the urethra. Its material is well-arranged, and it is full without being in any way tedious.

Stricture of the urethra, although of very frequent occurrence, is not quite so common a complaint as some would lead us to suppose. The fact is that every variety of urinary obstruction is liable to be stamped with this name, so that surgeons of experience tell us it is no rare occurrence to be able to pass a full-sized instrument, it may be with perfect ease, or at most with a trifling sense of irregularity in some part of the urethra, into the bladder of a person said to be suffering from more or less obstinate stricture. Difficulty in voiding urine, be it due to acute inflammation, spasm, or a hypertrophied prostate gland, is spoken of as stricture, and the confusion of ideas which arises from such inaccuracy of language may readily be understood. It is well, then, for Sir Henry Thompson to protest against the use of the word except with its legitimate meaning:—

> "Stricture may be defined as an abnormal organic contraction of some portion of the urethral canal."
>
> "Now this inflamed condition [inflammation of the acute kind which generally succeeds the acute gonorrhœa] should, I think, not be described by the word 'stricture' at all. The obstruction, it is now known, is occasioned by a general swelling of the prostate gland, and not by a limited contraction of any defined spot in the course of the canal. The condition very much resembles inflammation of the tonsils, and we never speak of the obstruction which this offers to deglutition as stricture of the throat, but reserve the word to describe any permanent organic narrowing of that region. I shall, therefore, not adopt the term 'inflammatory stricture' in this volume."
>
> "I am satisfied that there is no ground for recognising the existence of any stricture of the urethra due to mere muscular action alone, and shall decline also to employ the term 'spasmodic stricture.'"
>
> "Enlargement of the prostate, while it sometimes narrows, and frequently renders tortuous, that part of the urethra which passes through that organ, cannot be regarded as coming within the definition of stricture; that organic narrowing of the urethra only which commences within its

own walls, and not that which is caused by external tumour, being understood to constitute the stricture which, commonly affecting all other parts of the urethral canal, is not found in its prostatic portion."

While sympathising thoroughly with our author's objection to the expression "spasmodic stricture," we cannot agree with him in considering spasm a very rare cause of retention. He says—"Instances of retention of urine in the male, or of well-defined narrowing in any portion of the urethra, due solely to spasm of its muscular parietes, are, without doubt, very rare."

Now, to the house-surgeon of an hospital, where numerous cases of accident are admitted, the relief of retention from spasm, as a consequence of surgical shock, is not a very infrequent duty. The obstruction will sometimes be found very decided as well as difficult to overcome, being, moreover, caused by a contraction in the urethra, and not by any abnormal action of the sphincter vesicæ. Nor is such a state of matters a very rare occurrence after the ligature of internal piles or other operation on the region of the anus. This latter cause of urethral spasm Sir Henry Thompson himself mentions, as well as ulcer in the urethra, altered conditions of the urine, the effects of cantharides, turpentine, spices, and condiments, and even certain states of the mind. These causes may be rare ones; not so severe surgical shock and irritation about the rectum.

In regard to the number of strictures in one urethra, after quoting cases given by various surgeons (—in one of which, eleven were diagnosed during life—), Sir Henry says—

> "My own researches have not led me to recognise numerous independent strictures in one urethra. Three, or at the most, four distinct contractions is the highest number I have been able to discover, but such instances are very rare. A few examples of urethræ greatly contracted, from the meatus externus almost to the membranous portion, are in existence; but these do not exhibit a multiplicity of strictures so much as general thickening and coarctation of the canal."

Without doubt, the vast majority of cases of stricture have only one contracted spot in the course of the urethra; cases frequently occur having two or it may be even three, but more than this must be an extreme rarity. In an analysis of 270 preparations of strictured urethra given by Sir Henry Thompson, 226 were found to be contracted in one spot only. There are two causes, we believe, which may lead to the surgeon diagnosing two strictures when in reality only one exists. If an instrument be got through a stricture, it will occasionally pass on without difficulty for a little way and then become more or less firmly arrested a second time, although there be no second stricture. The gradual passage of the instrument so irritates the stricture as to cause it to contract very violently upon and retain the instrument in its grasp. The impediment is, under these circumstances, apt to be attributed to a situation corresponding with the point of the instrument, whereas it is really at the seat of stricture through which the point of the instrument has just passed, and this will be proved by the force required in the withdrawal. Again, the operator may successfully pass his instrument through the stricture, and yet have it arrested in the prostate by some irregularity or enlargement there. He then tells his patient that the difficulty is occasioned by a second stricture, and from both these causes we hear of double strictures more frequently than their existence warrants.

The results of our author's researches in regard to the locality of stricture—and they are derived from very extensive examination of preparations of the disease—are shortly these: that stricture, properly so-called, never occurs in the prostatic portion of the urethra, and in the membranous only as the result of injury; that of the different parts of the spongy portion—for this is the chosen seat of the disease,—that in the neighbourhood of the bulb is most apt to develop stricture; that close to the orifice of the urethra coming next in order of frequency, while the central portion seems to be less often affected than either. These views are now held, we think, by the majority of surgeons, and are of great importance with reference to the treatment of stricture, both by dilatation and cutting. The following "Classification of organic strictures according to their prominent pathological tendencies," appears to us very satisfactory, especially from a practical point of view:—

"I.—*Simple Stricture:*—

"Its chief sign is diminution in the size of the stream; there is generally increased frequency of micturition also, although the amount varies greatly in different cases.

"II.—*Sensitive or Irritable Stricture:*—

"Proneness to disturbance of the nervous system, as evidenced by chilliness, irregular circulation, or even rigors on very slight irritation. Great pain is caused even by the gentle application of instruments, and it continues sometimes long afterwards. In a few cases, also, a disposition to hemorrhage is manifested.

"III.—*Contractile or Recurring Stricture (Resilient of Syme):*—

"There is constant tendency to become narrower in the absence of treatment; and contraction rapidly recurs after dilatation has been applied."

Cases which come under the first of these classes, we believe, will generally yield to gradual dilatation by instruments; those included in the two last will often be found to require other and more severe measures.

Passing over the chapters on the symptoms, pathological effects, causes, and diagnosis of stricture, we may review very shortly one or two of the opinions expressed in regard to its treatment. The first question in this matter is the kind of instrument to be employed. Sir Henry Thompson writes:—

> "A large and observant experience has reversed my original views relative to some important points connected with this subject. For whereas, up to about twelve or fifteen years ago, I was influenced by the prevailing tendency among British Surgeons to prefer solid instruments to flexible; I have slowly, I may say unwillingly at first, arrived at a most decided preference for the soft and flexible instrument in every case in which it can be substituted for the other. In few words, the flexible instrument is capable of effecting all the good which can be achieved by the metallic instrument; and it does it with infinitely less of pain and irritation to the patient. The difference between the two, in most hands, often amounts to the difference between bleeding and not bleeding, pain and very slight discomfort, freedom from subsequent irritation and an attack of chill or fever. In some cases I still prefer the silver instrument, in what circumstances will appear as we proceed."

We cannot help thinking that this is an exaggerated statement of the supposed advantages of the one and of the defects of the other instrument. In the hands of an ordinarily skilful operator the silver catheter should cause neither bleeding nor material discomfort, while the command which its rigidity enables him to maintain over its progress allows of its accurate guidance. When we push an elastic instrument into the urethra, our hands, so to speak, cannot be held responsible for the course which its point may pursue. This will be determined rather by the nature of the parts through which it passes. If there be a false passage, it will probably go into it; if there be some irregularity in the canal, it will very likely get entangled in it, and no efforts of ours will *necessarily* make it pursue a course calculated to avoid these difficulties. Lastly, if the stricture be tight, chance will decide whether it hit the small orifice or no. On the other hand, the gentle and judicious operator, avoiding the exhibition of all force and impatience, can guide with confidence as well as safety the rigid instrument in whatever direction he chooses. Its extreme point obeys and must obey every movement of his hand. If it enters a false passage he has but to withdraw it a little, and pass it along another side of the urethra; if it becomes entangled in some lacuna he has but to alter slightly the direction of its point, and though the stricture be one of excessive tightness, by a system of patient probing he will probably not fail to discover its orifice. In short, the rigid instrument is obedient throughout its whole length to the slightest movement of the hand, the flexible is most provokingly the reverse. The course of the one can always be controlled, the other is incontrollable. All this no one apparently knows better than Sir Henry Thompson himself, for he distinctly states that the silver instrument is the only reliable one in cases of difficulty, whether from false passages, extreme tightness of the stricture, or a combination of both. Writing of the treatment of a difficult case, he first speaks of the use of the flexible instrument and then continues—

> "Supposing, then, that it (*i.e.*, the flexible catheter,) fails, the instrument which is especially useful for a case of real difficulty, depending on extreme contraction, is a very slender silver catheter, with shaft less slender and tolerably firm. Such an one is always to be used with the greatest possible care and lightness of hand, and is dangerous in the hands of any but an experienced operator."

The question of the danger involved no one will dispute; but where, we would ask, is the operator to gain that experience in the use of rigid instruments, by virtue of which he is to avoid dangerous manipulation, if, as our author recommends, he is to use elastic catheters in all except cases of real difficulty? Let the surgeon accustom himself, we would rather advise, to the use of rigid instruments in his daily practice, and he will be less likely to do damage with them, slender as they must be, when dealing with very tight strictures.

It is a point of great importance to determine how often it is advisable to pass instruments in treating a stricture by dilatation:—

> "The visit should be repeated generally in three days, or it may be in two (but not sooner), if neither pain, nor bleeding, nor much smarting in micturition, follow and continue after the operation. Sometimes a fit of shivering occurs, or the patient may be faint or sick, which are not unfrequent effects of the passage of an instrument, more especially when experienced for the first time. If any of these phenomena take place and are repeated, let the interval be lengthened a day or two, and inquire into the general condition of the health."

The first effect of passing instruments is to irritate the parts and cause aggravation of the symptoms. The day after they have been used the patient will probably feel more pain, and pass water in a smaller stream than he previously did. The next day, however, matters will probably begin to mend, and soon he will make water better, and with less pain than before the instruments were used. Once more, however, the stricture will begin to contract, and it is now, just when the tide of improvement is on the turn, that the surgeon should interfere. The interval between his visits, if determined in this way, will be found to vary in different cases, or in the same case at different times, but may be said never to be shorter than four or five days. Sir Henry advises somewhat more frequent interference.

Other modes of treatment are fully discussed, such as rupture, the employment of chemical agents, internal and external incision. Our author's estimate of these methods may be conveyed to the reader by the following quotations:

> "This plan [Rupture] has now been largely used by the profession, and several hundreds of cases have been operated upon, and with results which warrant the formation of conclusions as to its value. It possesses the merit of simplicity,—for provided the first instrument, a guide, is safely passed through the stricture into the bladder, the introduction of the large tube, which effects the rupture, is only a matter of force. No other operation for stricture is so easily accomplished, or is so unlikely to fail in the performance. To divide a stricture by any method of incision requires much more knowledge, practice, and tact; while it is, I believe, a more perfect proceeding in its results for really hard, old, and contractile strictures than rupture. Without doubt, urethrotomy, whether external or internal (and the latter is mainly referred to here), is infinitely more difficult to perform neatly and completely. The question of the permanence of the results from rupture is to a certain extent *sub judice*, but no operation for stricture can be relied on to free the patient altogether from disposition to return. Sooner or later the divided or ruptured tissues assert their influence on the calibre of the urethra, and reproduce some narrowing of it."
>
> "My own previously expressed opinion of the inferiority of the treatment by caustic to other means is corroborated; and I shall add nothing further to the explicit directions as to their employment, which it was necessary to afford in a treatise of this nature, except the expression of my own belief, as follows: 'I consider the application of nitrate of silver or of caustic potash to a permeable stricture of the urethra to be unnecessary as a means of cure, since other and better modes of treatment for such contractions exist; and that "impermeability," so called, is a condition always to be overcome by the careful use of simple instruments, and not to be attacked by any caustic or escharotic agents whatever.'"
>
> "Internal Urethrotomy is indicated in almost all strictures affecting the external meatus of the urethra; and for many cases of stricture situated about the middle of the spongy portion, for which dilatation has proved unsuccessful, it is the most efficient treatment existing. It is useful, also, in some few cases of stricture situated at the bulbous portion, which are not relievable by dilatation; a single incision which is not deep, being free from danger, and frequently rendering the stricture perfectly amenable to dilatation afterwards. Lastly, it is so in those rare cases in which the urethra is narrowed and indurated at many points, or throughout a great portion of its course, dilatation having been found inefficient. But in the

two latter classes the treatment by rupture is perhaps as useful in most cases, and much easier to perform.

"The cases for which this operation [External Division] may now be reserved are mainly those in which large, numerous, or obstinate perineal fistulæ, co-exist with old or obstinate strictures. When other treatment has failed, and the fistulæ refuse to heal, even although the patient has withdrawn for some weeks his urine entirely by catheter, no proceeding, perhaps, offers so good a chance of cure as this."

We have thus shortly and very imperfectly indicated the subject-matter of this book. A very distinct verdict has been already passed in regard to its value, both by its having received the Jacksonian Prize of the Royal College of Surgeons of England for 1852, and by the fact that a third edition has now been found necessary. It is, therefore, almost superfluous for us to recommend it as an excellent epitome of all that concerns the subject of stricture, and as a work, too, not lacking in original research and suggestions.

Clinical Record.

I.—CASE OF BURSAL SWELLING OF THE PALM OF THE HAND AND WRIST, TREATED ANTISEPTICALLY.

Reported by HECTOR C. CAMERON, M.D., *Glasgow.*

A. M., aet. 21, engaged in an engineering work, was sent to me by one of his employers on account of swelling in the palm of the hand and above the wrist. A year and nine months before, he had violently strained his wrist. Three months after, the fingers began to feel stiff, especially in taking a firm grasp of anything, and the wrist and palm to swell. The swelling continued to increase in spite of repeated blistering. The pain caused by it about a week before I saw him was excessive, keeping him awake at night, and being especially severe towards morning. Two rounded and prominent swellings occupied respectively the palm of the hand and the forearm immediately above the wrist. The sense of fluctuation was easily elicited from one to the other, and when the wrist-joint was flexed, so as to relax the structures at its palmar aspect, a "crunching" sensation was in addition communicated to the fingers. The little and ring fingers were more or less completely flexed, while the whole hand was so weak and painful as to be useless.

On August 8th, I opened the cavity by incising the swelling in the forearm, under a piece of lint, dipped in a solution of one part of carbolic acid to four parts of olive oil. This gave exit to a quantity of serous fluid, containing numerous solid bodies, some of them being of considerable size.

I dressed the wound with the antiseptic lac plaster, and put the hand on a splint. The next day he had lost all pain, and only a few drops of serum stained the bandages. I dressed it as before. In a few days all discharge ceased, but I continued to dress it in the same way until September 2nd, when I found it soundly healed.

A week after this, as there was still a little thickening in the palm of the hand, although no fluid, I ordered him to apply a blister. The fingers were still somewhat stiff, and their extension painful. I saw him again to-day (October 16th). The palm and wrist are quite normal, the fingers in natural position, and the hand as useful as ever.

Remarks.—This affection is essentially a collection of fluid containing moveable pieces of indurated lymph, and occupying the bursal sheaths of the tendons which pass from the forearm to the hand. It is frequently called ganglion, but as this name is applied to an affection of a totally different sort, and requiring very different treatment, namely a little circumscribed bag of fluid attached to a single tendon (generally one of the extensors), it is well to avoid the confusion of ideas which must arise from giving them both the same name. The advantage of avoiding deep-seated suppuration in this situation is manifest, and although Mr Syme's practice of dividing the annular ligament makes it less serious, and gives very successful results, the cure cannot be so certain or speedy as when suppuration does not take place at all.

II.—ABSCESS TREATED ANTISEPTICALLY.

Reported by HUGH THOMSON, M.D., *Glasgow.*

15th September, 1869.—Miss H., age 58, of delicate constitution, the subject of an extreme degree of lateral curvature of the spine, much emaciated and convalescent from a severe and dangerous attack of melancholia, was found to have a large abscess at the inferior angle of the scapula, on the side corresponding to the convexity of the spine. The abscess extended from a point two inches on the vertebral side of the scapula to the posterior border of the axilla, and appeared to pass, in some measure, between the scapula and ribs.

Having previously dipped the bistoury in a solution of carbolic acid in water (1 to 32), I opened the abscess a little below the angle of the scapula, and gave exit to about six ounces of laudable pus. As no more matter would flow freely, although a degree of fluctuation was still present, I decided not to risk the entrance of air into the sac of the abscess by manipulations around it, and after wiping the wound with the solution of carbolic acid, covered it up with a piece of carbolic acid plaster.

16th.—Wound closed. No discharge. Redressed with carbolic acid plaster.

19th.—No change. Fluctuation still evident.

22nd.—No change.

From this date the fluctuation became less and less distinct, until the 2nd October, when it had entirely disappeared, and the patient could use the arm almost as freely as before the occurrence of the abscess. The only treatment was the carbolic acid plaster, as prepared by the Glasgow Apothecaries' Coy. for Mr Lister, five inches square applied continuously.

The entire absence of suppuration in the wound, and freedom from irritation in the pyogenic membrane, subsequent to opening the abscess, support Mr Lister's views.

III.—CASE OF OPERATION FOR STRANGULATED INGUINAL HERNIA.

Under the Care of Prof. LISTER.

Reported by JAMES COATS, M.B., C.M., *House Surgeon.*

H. R., aged 21, fireman, admitted to the Royal Infirmary July 30th, 1869, about 9.30 a.m., with a moderately large inguinal hernia on the right side, apparently direct, from the position of the neck of the tumour, with symptoms of strangulation.

Patient stated that the protrusion only occurred at 8 p.m. of the previous day, up to which time he had not been troubled by hernia for four and a half years, though he then suffered from it, and had to wear a truss for six months. The hernia came down then, as on the present occasion, suddenly while he was at work.

At 10 a.m. he was put under chloroform, and an effort made by Prof. Lister at reduction by taxis, but unsuccessfully. He, accordingly, at once proceeded to operate.

The parts having been shaved, and well washed with solution of carbolic acid, (one part, to twenty of water,) an incision, two and a half inches long, extending into the scrotum, was made through the skin upon the neck of the tumour. The external ring, being found to form a constriction, was divided with a probe pointed bistoury, and taxis again tried, but without success. Mr Lister accordingly proceeded to open the sac. A considerable quantity of serous fluid escaped, and a piece of omentum, six inches long, by five or six wide, and very black in colour, was exposed. It was folded in a cloth, dipped in 1 to 40 watery solution of the acid, and turned to one side. Behind this was found a fold of intestine, of deep claret colour. The testicle also slipped up into view, in the lower part of the wound. Mr Lister, introducing his finger, now discovered a second very tight and firm constriction, apparently the conjoined tendon, which he divided with a probe pointed bistoury, the tissue crying under the knife. The neck of the sac forming a third constriction, very tight but thin, yielded before the finger tip. The intestine having been well washed with 1 to 40 solution was now returned, and the omentum was uncovered and examined. It had assumed a rosy vascular appearance, circulation being evidently re-established. One part, however, about an inch wide, considerably ecchymosed, and somewhat detached from the rest, was ligatured with antiseptic cat-gut, and removed. The remainder was returned. The wound was thoroughly sponged with 1 to 40 solution, and closed by points of interrupted cat-gut suture. All instruments, and the hands of those engaged in the operation, were dipped in 1 to 40 solution.

The dressing consisted of a piece of antiseptic lac plaster, as recommended by Mr Lister, coated with gum copal to prevent irritation to the wound, overlapping about an inch, this being in turn overlapped for three or four inches by two layers of lac plaster without the copal coating. A pad was placed over the region of the wound, and the whole secured by bandaging. Ordered m. xxx. Sol. Morph. Hydrochlor. and fluid diet.

July 31*st*, *Noon.*—Pulse 72. Tongue natural. Took breakfast with relish, but complains of a little uneasiness in hypogastrium. Only a few minims of discharge on the bandage. Dressing not disturbed. Temp. in axilla 100°·7.

August 1*st.*—Pulse 62. Temp. 99°. Dressing not disturbed. As bowels have not acted, to have Ol. Ricini ℥ss.

2*nd.*—Pulse 62. Tongue clear. Appetite good. Wound dressed today at 4 p.m., a stream of 1 to 40 solution from a syringe being thrown on it constantly; the dressing is similar to that adopted at first, except that the pad has been omitted. The wound is not quite united, as between the stitches, in nearly its whole length, altered clot is visible. There is some fulness about the incision, as if from retention of discharge, but no irritation or tension. The castor oil, ordered yesterday, has acted freely, and he is quite free from uneasiness. Indeed, he got out of bed last night in spite of the nurse's remonstrances, and felt no inconvenience from the movement. He also slept well without an opiate.

4*th.*—Wound dressed by Mr Lister as before. The fulness round it is decidedly less. On firm pressure two or three drops of a peculiar orange coloured serous fluid escaped from the lower angle of the wound, which otherwise has much the appearance described in last note. Pulse 60. General condition excellent.

5*th.*—Some uneasiness, complained of yesterday during the squeezing of the wound, continued to keep him awake till about 1 a.m. He then slept three hours. Uneasiness recurred slightly this morning, but has again left him. Pulse 60. Bowels acted spontaneously yesterday, the stool being of natural consistence and passed without pain.

7*th.*—Wound dressed. Some of the stitches have been absorbed in their deeper parts, and have been lifted off. Some others have been divided. There is a layer of lymph over the wound, concealing the amount of cicatrization. No pus can be squeezed from the incision, but the testicle has been dragged up from the scrotum, and is lying beneath it, accounting for the fulness already mentioned, and the sickening uneasiness produced by pressure.

11*th.*—Wound dressed. It is found to have stretched considerably, but the edges are cicatrizing, and there is no odour. The testicle still lies under the incision. Copal-covered lac plaster alone is used in the dressing.

16*th.*—Since last note nothing worthy of record has been observed in the progress of the case till to-day, when he complains of uneasiness in the right side of the abdomen, which is more resistent on pressure than the left, but there is no alteration on percussion. Pulse 64. Tongue clean. Ordered Ol. Ricini ℥ss., as the bowels are rather torpid. The wound is perfectly sweet and cicatrizing beautifully.

17*th.*—The firmness on the right side of the abdomen is greater, and the uneasiness has increased. Ordered a poultice over the abdomen outside the dressings.

25*th.*—The uneasiness and firmness of the abdomen still continuing, a fly blister applied at night over the right side above the line of the dressings.

September 8*th.*—The blister mentioned in last note acted admirably, the hardness disappearing in a few days.

He is to-day dismissed, the wound being almost wholly firmly cicatrized. The testicle is also descending somewhat.

The points of interest in this case are numerous, and are chiefly the following:—First, Its history, in connection with the curious anatomical condition; that, though not a congenital hernia, but a direct protrusion occurring first when the lad had attained the age of 16, and which had wholly disappeared again for nearly five years, it should be found invested by the tunica vaginalis. Second, The total absence of constitutional disturbance after the operation. Third, The position assumed by the testicle below the wound, and its permanence there. J. C.

IV.—CASES OF PUERPERAL INSANITY.

Under the care of, and Reported by, Dr Robertson,* *Physician to the City Parochial Asylum.*

Case 1.—H. C. S., aged 23, married, admitted 9th June, 1869. Three weeks since gave birth to a child, and five days afterwards symptoms of mental disorder set in; at the same time her right mamma became severely inflamed. Her friends stated that she had been much excited, had talked incoherently, and showed great aversion both to her husband and child. She had been actively treated for both ailments; either three or four medical men having been in attendance. She was admitted in a very exhausted state, her pulse being exceedingly feeble and rapid, so that it could not be counted. The tongue was dry and brown; for many days she had scarcely tasted food; had great thirst; had not slept an hour a night since the child was born; the pupils were rather contracted, and the conjunctivae slightly injected. She was perfectly quiet—in fact, would not speak, merely looking around with a stupid, vacant gaze. Her breast was in a very bad state. There was a cavity in it, the result of sloughing, large enough to hold a good-sized apple; and the remainder of the gland was much indurated, and its surface of a livid hue.

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* These cases were under the observation of my Clinical Class.—A. R.

She was placed in bed in a darkened room; a special attendant appointed to wait on her night and day; and attention given to maintain the extremities at a proper temperature, as they were apt to be cold. 6 oz. of wine, beef-tea, and new milk, were directed to be given in moderate quantities at short intervals, and the following medicine,—Tk. Hyoscyami ʒiiss., Sp. Chloroform. ʒiss., in water every 4 hours, unless when asleep. A few hours after admission, when she had revived a little, free incisions were made at several points in the mamma, giving vent to pus which had burrowed through the substance of the gland in all directions.

I did not see her afterwards till the morning of the 11th, when I noted that there was a little improvement in her general condition. The tongue was beginning to moisten, and the conjunctivae were clearer; she had slept four hours during the night; had taken some food, wine, and medicine yesterday, but would take nothing this morning. Throughout the day she obstinately refused to take anything, and as she could not bear further abstinence in her exhausted state, in the evening I fed her by means of the stomach-pump, injecting slowly about three English pints of gruel consisting of new milk and flour boiled, with 3 oz. wine, and a dose of her medicine. On the following morning I found that she had slept 5½ hours, but that she continued to refuse food. No urine passed since yesterday, and none apparently in bladder; bowels not moved. An enema of soap and water was ordered; a linseed and mustard poultice, and afterwards hot fomentations over kidneys; cream of tartar to be given by the mouth, and, if necessary, by the stomach-pump.

During this time she rarely spoke, but lay quietly in bed, occasionally making some foolish remark, such as, "I'm a brute."

On the 15th it is recorded that during the two previous nights she had slept five hours a night; that there was more volume in the pulse, which was 100 per minute; that the tongue was moist and clean; that her bowels were free, and that she had passed a large quantity of urine of normal properties. Her breast was also assuming a healthy aspect. She still, however, refused to take food, and was therefore fed by the pump twice daily, beef-tea being substituted for the new milk in the evening. A dose of the Hyoscyamus and Sp. Chloroform. mixture was also administered with the gruel. From this time she continued to progress favourably; her breast healed; she gradually regained strength; her mind became clearer; but she was long melancholic and persisted in refusing to take food, requiring forced alimentation, till about a fortnight before she was removed by her friends on the 3rd August. At that time she talked rationally, though still suffering from emotional depression, and altogether not thoroughly well mentally.

CASE 2.—J. L. C., aged 23, admitted 24th May, 1869. 18 days before admission had been delivered of a child—her second—after an ordinary labour, and four days afterwards had become excited, noisy, and restless—her friends stating that she had not slept above six hours during the last nine days. They said that she had talked incessantly, requesting to be supplied with silk dresses, jewelry, money, and fine cottages. Her general condition was reduced; pulse 124, small and very weak; head cool; pupils much dilated; tongue moist—coated with a thick, yellow fur; had taken scarcely any food since the child was born; was thirsty, and bowels had been confined for three days; lochial discharge had ceased; no milk in breasts, and an abscess had formed in left one, which was opened. Was ordered, Pulv. Rhei, gr. x, Hydrarg. c. creta, gr. v, P. Zingiber. gr. v; to be followed in four hours by ol. ricini ʒvi; and after bowels became free, S. M. morphiæ gtt. xl, Tr. Hyoscyam. ʒiss—in water every four hours; a mustard foot-bath at bedtime at 100° F., with cold lotion to head while getting bath; 4 oz. wine, and beef-tea in moderate quantities, every three or four hours. She was at once put to bed in a darkened room.

Under this treatment her progress was satisfactory;—she took a fair quantity of food, slept several hours each night, the pupils became less dilated, and the pulse slower (108 on the 26th). There was also not so much mental excitement, though she was still occasionally a little noisy for a few minutes, alleging that she was getting "Pritchard's medicine." On the 28th it is noted that she had been somewhat noisy during the night, and continued excited in the morning, and that her pulse was 120 and rather full. Another abscess had formed in the same mamma, which was opened. The wine was omitted, as was also the morphia mixture. Instead of the latter, a draught containing Tr. Hyoscyam. ʒii, Sp. Chloroform. ʒss, was given every four hours. The mustard foot-bath was continued as before.

The details of after-records need not be given. Let it suffice to say that on the day following she was better, both physically and mentally; and from this time forward, with the exception of a relapse for two days about the middle of June, she made an excellent recovery, and was dismissed cured.

Remarks.—As a rule, only the severer forms of puerperal insanity are admitted into asylums, those of a milder character being usually treated at home. Any variety of mental disorder may occur in connection with the puerperal state, but, generally speaking, the maniacal is met with most frequently shortly after delivery, the melancholic developing itself as a result of prolonged, or more commonly, undue lactation at a later stage. There are, however, many exceptions to this rule. For instance, at present there is a case under my care in which sub-acute mania occurred after nursing for some months; and, on the other hand, the first of the two cases here recorded set in as mania, but after about ten days assumed the melancholic form, combined with stupor—the *mélancolie avec stupeur* of the

French. The prognosis is upon the whole very favourable, but by no means so much so as many have supposed, as every asylum contains incurable cases which originated in the puerperal condition. In this asylum there are resident two such cases, the one originally mania, the other melancholia, but both now sunk in hopeless dementia.

The preparations of opium are usually held to be of special service in all the forms of puerperal insanity, and so they generally are, except in the early stage when the febrile symptoms are marked—such as heat of skin, thirst, and dry tongue. Then, there can be no doubt, they are positively injurious. In these conditions reliance ought rather to be put in Hyoscyamus, which is less apt to disagree. Mustard foot-baths to the weaker patients are occasionally very soothing; and the more robust are often much benefited by a warm bath at 96° for from half an hour to an hour. In both cases the head should be kept cool by lotions while the bath is being administered. Of even more moment in these very acute cases,—which are generally maniacal, at least, in the first instance,—is the administration of fluid nutriment at short intervals; and should the exhaustion be marked, wine, as a rule, is clearly very beneficial. The due action of the excretory organs—for instance, the kidneys in the first case described—must be promoted, if necessary.

V.—CASE OF TRANSFUSION.

Under the Care of Mr LISTER.*

Reported by WILLIAM MACEWEN, M.B., *House-Surgeon.*

W. C., aged 22 years, engineer, was admitted to the Royal Infirmary May 25, 1869, with his arm completely severed at the junction of the middle and upper thirds of the humerus; having been torn off by machinery. The soft parts were much lacerated above this, and the brachial artery was exposed for about two inches; and though no surgical interference had been resorted to before coming into the house, no bleeding except capillary oozing was present.

Amputation at the shoulder-joint was, in the absence of Dr MacLeod, performed by Dr Watson, the flaps being with difficulty obtained, owing to the extensive destruction of the soft parts. The bleeding points were secured by ligature, and the flaps were brought together by silver wire sutures. The wound was dressed with a piece of lint saturated in a solution of carbolic acid in water (1 to 20).

All went on well. On the 2nd June the ligatures, with the exception of the one on the axillary artery, separated, and were removed. On June 6, 1869, the wound was strapped with adhesive plaster to prevent bagging of discharge, which was profuse. The ligature having separated from the axillary artery, granulations were beginning to cover the extremity of the vessel which was very near the edge of the wound.

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* It will be observed that Mr Lister's connection with this case began with the transfusion, 2nd July.

On June 17, a small abscess pointed at the distal extremity of the clavicle, which continued to discharge a small amount of purulent matter for a considerable time.

On the 28th June he was so far recovered that his removal to the country was meditated and fixed for the 3rd of July. The wound was at this time nearly all cicatrized, the only part which was not so was about one inch in length, and communicated with the interior.

On the evening of 2nd July (being the 38th day after amputation), secondary hæmorrhage took place. The first thing which drew the patient's attention to the occurrence was his weak, uneasy sensation, and putting his hand to his shoulder he felt blood streaming down into the bed. It was afterwards found that the mattress on which he lay was soaked through its whole thickness. The bleeding point was secured by a ligature which held for 27 hours, when hæmorrhage again took place.

In Dr Macleod's absence, Mr Lister was sent for. Meanwhile the artery was tied about one and a half inches from its distal extremity by passing an aneurism needle under the vessel, and so securing it. The patient was at this time so much exhausted as to be apparently moribund. Mr Lister proposed transfusion, should a suitable person be found from whom to extract the blood. A man in one of the wards, affected with a trifling malady, and who had a robust constitution, volunteered to furnish blood.

The patient was then placed in a good light, and each of four assistants had a distinct duty allotted to him. One was to take charge of the man from whom the blood was to be withdrawn, his duty being to control and regulate the supply of blood from the vein after venesection was performed. This he was to do by placing his thumb over the vessel after it had been cut, and removing it when a supply of blood was wanted by the operator. The second was to take charge of the patient's arm, holding it much above the level of his (patient's) body, so as to allow the force of gravity to facilitate the entrance of the blood into the vein. The third was to sponge the part when required; while the fourth with one hand was to pinch up one side of the incision made into the vein in patient's arm, while Mr Lister held the opposite side, to permit of the easy entrance of the nozzle of the syringe, by which the blood was to be thrown into patient's body; with the other hand he was to exclude the entrance of air into the vein by placing his thumb about one eighth of an inch from the incision, just as the nozzle of the syringe was withdrawn to be refilled. The blood was to be shed from the man's arm into a bleeding-cup, and a common brass syringe was employed.

Everything being ready, Mr Lister pinched up a portion of skin over the basilic vein of the patient's arm, and dividing it, cleared the vein about a quarter of an inch, then made an incision into it—the one side of which was pinched up by the assistant's forceps, and the air excluded by him as before mentioned. The median basilic of the other man was freely opened, and a large stream of blood flowed. From this, just as it was poured into the bleeding cup, the syringe was filled, and after ejecting a small quantity from the nozzle, (while the syringe was held with the nozzle uppermost,) to insure the exclusion of air, it was introduced into the vein of the patient and injected. Each time that the syringe was filled, the assistant stemmed the stream of blood until the syringe required to be replenished. In this way ℥x. of blood were injected by six and a half syringe-fulls.

Immediately after the operation patient did not seem much improved, but one hour after he expressed himself as a great deal better, and soon after he fell into a sound sleep, from which he awoke quite refreshed. The colour returned to his cheek, his voice resumed its natural tone, his body became warm, and all seemed to promise well.

About 10 a.m. of the same day the bleeding from the main trunk recurred for the third time. Pressure was immediately applied to the subclavian, and the axillary was ligatured by Mr Lister just where it emerges from beneath the clavicle. At this time patient lost about 6 ounces of blood.

During Sunday and Monday (4th and 5th July) patient got much stronger. He seemed in good spirits, enjoying natural sleep, from which he awoke refreshed. His appetite was good, but his stomach was irritable, so that he vomited several times. His pulse varied from 110 to 120, and was easily excited.

On Tuesday morning, about three o'clock, patient expressed a desire for some tea, with a small portion of toasted bread. His request was acceded to, and just as he finished the last portion of his bread (half a slice in all), he became suddenly comatose, in which state he remained for two hours and then expired, three days after transfusion had been performed.

With great difficulty an *examination* was granted, and then only conditionally, that nothing should be touched except the chest and artery. Permission to have the head opened was absolutely refused. The base of both lungs was congested. On the periphery of the left lung an abscess about the size of a pigeon's egg existed. Several tubercular deposits were found in the apices of the lung. Otherwise the lung was normal.

On examining the artery it was found that the extremity was ulcerated, that the part on which the second ligature had been placed was diseased, being soft and friable, so that the ligature had partly severed the artery. The tissues round the artery were in an unhealthy condition, showing diffuse suppuration.

VI.—CASES ILLUSTRATIVE OF PAPER ON FEEDING BY THE NOSE IN FEVER (p. 79.)

Under the Care of Dr Russell.

Reported by Dr Tennent, *Resident Physician, City of Glasgow Fever Hospital.*

Case I.

Elizabeth B., aged 29, married, admitted September 14th. Took ill with shivering and headache on the 7th curt. On evening of this the 8th day pulse 112, soft. Typhus rash copious.

9th day, 12 *p.m.*—Pulse 140; very small and feeble. Countenance pinched and bluish. Wine, 4 oz.

8 *p.m.*—Pulse 128; improved. Has been refusing drinks, and will not speak. Lies in a dreamy apathetic way. Eyes staring and vacant. Shave head and apply blister.

11.30 *p.m.*—Pulse more feeble. Has taken nothing since last note. One pint of Liebig's beef-tea, with an ounce of brandy given by nose.

10th *day*, 12 *p.m.*—Pulse 116; improved. Swallowed fairly during night. Less pinching of features. Tongue furred, but moist and pliant. Says she feels better. Stop wine. Give 3 oz. brandy.

7.30 *p.m.*—Pulse 124; soft and feeble. Has been again refusing drinks. Give 2 oz. more brandy.

11*th day*, 12 *p.m.*—Pulse 118; very small and feeble. Tendency to collapse. Declines milk, but takes Liebig freely. Give half an ounce of brandy every hour.

7.30 *p.m.*—Pulse 116. No improvement. Will not swallow.

11 *p.m.*—Pulse very soft and feeble. Has taken nothing whatever. One pint of Liebig, with an ounce of brandy given by nose.

12*th day*, 12 *p.m.*—Pulse 108; very feeble. Condition unchanged. One pint of milk, with an ounce of brandy given by nose.

7.30 *p.m.*—Pulse 116; small and feeble. No change otherwise. Still never speaks. Was fed at 7 p.m.

11 *p.m.*—Again fed with Liebig and brandy.

13*th day*, 11.30 *a.m.*—Pulse 112; still feeble. Was fed at 9 a.m. with milk and brandy. Will not take anything voluntarily. Said to nurse during night that she wished to die.

7 *p.m.*—Pulse so very feeble that it cannot be counted. Still refuses everything. Aspect much sunken. General tendency to coldness. Apply hot bottles, additional blankets, &c. Was fed at 1 and 6 p.m. with Liebig and milk alternately.

8.30 *p.m.* 11.30 *p.m.*—Fed with Liebig and milk alternately.

14*th day*, 12.30 *p.m.*—Pulse 120. Improved in pulse and appearance, but still will not drink. Two loose motions. Was fed at 4 and 9 a.m.

7.30 *p.m.*—Pulse 112; improved. No motion. Slept. Was fed at 2 and 6 p.m.

10.30 *p.m.* Again fed with milk and brandy.

15*th day*, 12 *p.m.*—Pulse 112; much improved. Obstinately refuses, however, to swallow. Three very loose motions. Give enema of 10 drops of laudanum with starch. Was fed at 3.30 a.m., 8.30 a.m., and 12 p.m. Stop Liebig in the meantime.

8 *p.m.*—Pulse 108; still improved. Four loose motions. Was fed at 2 and 6 p.m. with milk, lime water, and brandy.

11 *p.m.*—Again fed with milk, lime water, and brandy.

16*th day*, 12 *p.m.*—Pulse 136. Probably excited. Is gaining in bulk of face and body. Was fed at 4 and 9 a.m. Motions still very loose. Repeat laudanum and starch enema.

7.30 *p.m.*—Pulse 124. No motion. Was fed at 1 and 6 p.m.

17*th day*, 12.30 *p.m.*—Pulse 116. One motion, not loose. Was fed at 12 midnight, and 4 and 9 a.m.

7.30 *p.m.*—Pulse 120. No motion. Still determined not to swallow. Was fed at 2 p.m.

11 *p.m.*—Was fed at 8 p.m. Since then has taken some drinks spontaneously.

18*th day*, 12 *p.m.*—Pulse 104. Still continues to swallow pretty well.

7 *p.m.*—Pulse 128; more feeble. Drank freely till 5 p.m. Since then has again refused to swallow.

11 *p.m.*—Again fed at 8.30 p.m. with Liebig and brandy.

19*th day*, 12 *p.m.* Pulse 112. No motion. Improved in manner, but still odd. Produces stiffness of arm when pulse is being counted, and tries to prevent it. Was fed at 1.30 and 10 a.m.

8 *p.m.*—Pulse 132. Is very melancholy. Asserts that her sins will never be forgiven, &c. Was fed at 2 p.m. with egg, milk, and brandy, and again at 7 p.m.

11.30 *p.m.*—Again fed with egg, milk, and brandy

20*th day*, 12 *p.m.*—Pulse 112. Has drank pretty freely since last feeding. Took some tea and an egg this morning. No motion. Slept well.

7.30 *p.m.*—Pulse 108. Has taken a little milk, but was again fed at 2 p.m.

Patient now began to improve steadily, though very slowly, requiring for some time considerable coaxing to take the requisite amount of food.

September 30*th.*—Allowed to rise for a little. Mind greatly astray. Does not understand where she is or why she is here. Cries, asking to be forgiven. Waves hands about unmeaningly to us. Takes food freely. Bowels regular. Tongue deeply furred.

October 7*th.*—Patient greatly improved. Intelligence nearly perfect. Works very well about ward. Still, however, a little odd and slow in manner, and rather melancholy.

CASE II.

David F., aged 55. Admitted August 15th, at 4 p.m. In apparently a moribund state. Almost pulseless. Collapsed. General lividity and coldness. Typhus rash very abundant and petechial. Refuses to swallow or even open lips. Apply hot bottles, mustard poultice to throat, and give 3 oz. whisky.

6 *p.m.*—Not the least improvement. Will swallow nothing. A pint of Liebig with an ounce of brandy given by nose.

8 *p.m.*—Pulse 112. Somewhat recovered, but still will not swallow, speak, or pay the slightest heed to what is said. Pupils natural. To be fed by nose every four hours. Shave head.

August 16th, 11.30 *a.m.*—Pulse 112. Condition much improved as to general strength and appearance. Lies as if dozing. Twitchings of shoulders and limbs generally. Still obstinately refuses to swallow. Continue feeding every 4 hours, and give enema of castor oil and turpentine.

8 *p.m.*—Pulse 106; full and strong. About 4 p.m. began to swallow, and has since drank pretty freely. Enema acted, but not thoroughly. Give castor oil.

17*th*, 12 *p.m.*—Pulse 96. Still drinks freely.

No further necessity for feeding ensued, but the virulence of the fever displayed itself by the occurrence of extensive parotid swelling, which suppurated, and by the appearance of carbuncles and boils over body generally, in consequence of which he is still (Oct. 12th) in hospital, although going about.

TRANSACTIONS OF
The Medico-Chirurgical Society.

SESSION 1868-69.

ELEVENTH MEETING, 7th May, 1869.—Dr Fleming, President, in the chair.

Dr Eben Watson read a paper "ON THE THEORY OF SUPPURATION, AND THE USE OF CARBOLIC ACID DRESSINGS."

After adverting to the older theories of the formation of pus, he dwelt more at length on the septic theory, according to which suppuration is considered as a kind of fermentation promoted by the growth of living animal and vegetable matters floating in the air; and he referred especially to Dr Lemaire's views about the production of pus by the action of the air causing fermentation. Dr Watson contended that the presence of germs in the air is very doubtful—that he had not found vibriones in pus—that the presence of those germs was not necessary to its existence or formation, and that the putrefaction was caused by the oxygen of the air combining with tissues either deprived of life, or in which the vitality is very small. He next proceeded to explain what he believed to be the rationale of the use of carbolic acid dressing. Its action (according to Dr W.) is mainly attributable to two effects, which all antiseptic substances produce, viz., First, It coagulates albumen, and thus renders the surface to which it is applied firmer, and enables it to resist the action of the air. Second, It keeps in the fluid discharges, and since the carbolic acid is volatile, and contains a large percentage of carbon, it feeds the oxygen of the air, and saves the carbon of the tissues. Dr Watson lastly gave a number of examples of his experience of the use of carbolic acid dressings.

A prolonged discussion ensued, in which Mr Reid, Drs Morton, Renfrew, MacLeod, Lyon, and the President, took part.

SESSION 1869-70.

First Meeting, 3rd September, 1869.—Dr Fleming, President, in the chair.

The following gentlemen were elected office-bearers:—*President*—Dr J. G. Fleming. *Vice-Presidents*—Dr E. Watson and Dr Steven. *Council*—Dr G. H. B. Macleod; Dr A. R. Simpson; Dr Richmond, Paisley; Dr F. Thomson; Mr Torrance, Airdrie; Dr H. Thomson; Dr James Gray; Mr Robert Grieve. *Secretaries*—Dr James Adams and Dr R. Perry. *Treasurer*—Dr H. R. Howatt. The President delivered an opening address.

Dr Perry exhibited a specimen of hydatids from the liver, passed at stool that day by a private patient of his, who had been suffering for the last two months from symptoms of hepatic disorder, which gave rise to enormous distension of the liver. He had passed a large quantity of these hydatids of all sizes—from the bulk of a pin-head to that of a large apple, and the liver had now very much diminished in size. About a year before the present attack he complained of similar symptoms,—very severe pain in the epigastric region, which could not be relieved by any means, but gradually passed off without causing any enlargement of the liver. The disease was very rare in Scotland. Dr Gairdner, he remembered, had exhibited to the Society, last session, a specimen of echinococcus of the liver, the first which he had ever seen.

Dr Scott Orr mentioned, as showing the rarity of hydatids in this country, that he had several years ago had a case of uterine hydatids, and he then searched the records of the Infirmary for similar cases and found only one.

A conversation took place as to the best anthelmintics in tape worm. There was a general concurrence of opinion in favour of the male fern.

Second Meeting, 1st Oct., 1869.—Dr Eben. Watson, Vice-President, in the chair.

Dr Morton read a paper on

"CARBOLIC ACID—ITS THERAPEUTIC POSITION, WITH SPECIAL REFERENCE TO ITS USE IN SEVERE SURGICAL CASES,"

in which he contended that the results of an experimental comparative use of carbolic acid dressings failed to prove the superiority of this over the more usual forms of treatment. The paper was illustrated by copious references to the practice pursued in the wards recently under his care in the Royal Infirmary.

Dr Ritchie, after complimenting the essayist on the calm and philosophical character of his remarks generally, said that a comparative trial of various therapeutic agents was attended with very great difficulty: the sources of fallacy were so numerous. The results of such a trial could hardly be relied on, unless all the elements of each case had been taken into account. He was therefore disposed to attach little value to a comparison of cases merely as regards the one element of time, as the mere circumstance of confinement in a house is only a small part of the history of a case. With regard to the question of pyæmia, he remembered that it was supposed that the vicinity of the Infirmary to large pits of dead bodies was one great cause of the disease within its walls, especially when, along with this, there was an imperfect state of ventilation in some of the surgical wards. It was decided to remove the bodies, and to thoroughly ventilate the wards; and when this was effected, there was a great improvement as regards the prevalence of pyæmia.

Dr Renfrew thought Dr Morton's cases were inconclusive. With regard to the treatment of pyæmia, if it is dependent on the absorption of pus, then surely an agent which has a tendency to prevent the formation of pus must be inimical to pyæmia. He would appeal to their experience whether before the introduction of the antiseptic system psoas abscesses had been so quickly amenable to treatment. Dr Renfrew then detailed two cases of severe injury in which he had employed carbolic acid with marked success, and without the formation of pus.

Mr John Reid said that, like most surgeons, he had treated wounds in many different ways, and he invariably found that the rapidity with which a wound healed depended on the state of the system of the patient. Much had been said about the effects of the new system in protecting wounds from what were called the bad effects of the atmosphere. The atmosphere, which from their earliest years they were accustomed to regard as their best friend, must now be looked on as their worst enemy. Instead of breathing a pure mixture of oxygen and nitrogen, they were really swallowing myriads of living animalculæ. The idea was too absurd to be soberly entertained. The process of healing is a natural process, and cannot be accelerated much by any applications unless such as are bland in their nature. Dr Burns was in the habit of saying to his students, "You must look on suppuration not as an enemy, but as a friend;" and he (Mr Reid) believed that Dr Burns was right.

Dr Wolfe said that some years ago, when Professor Lister brought out his papers in the *Lancet*, he wrote to that journal claiming priority with regard to the suggestion of the employment of carbolic acid; for, some eighteen months before the appearance of Mr Lister's paper, he (Dr W.) published a paper in the *Medical Times and Gazette*, in which he stated his conviction that carbolic acid when used in dressing wounds would greatly lessen the risk of purulent infection in the surgical wards of our hospitals. Mr Lister has injured his practice by basing it on an erroneous theory. In 1863, experiments were made by M. Pouchet, and others, and the results reported to the French *Academie*, by which it was proved that there are no sporules in the atmosphere. These experiments were made in Spain, Switzerland, and other countries, and the result was the same in each. Nothing has been written to disprove these experiments. But although the theory is exploded, we must admit the efficacy of carbolic acid as a surgical dressing. Indeed, it was quite possible that although the theory was not true generally, it might be quite true as regards the air of our hospitals. Sporules may exist and be generated in such an atmosphere, and coming in contact with raw surfaces may give rise to suppuration. It is indisputable that some contamination of the atmosphere often does exist, as, for example, when puerperal fever spreads through a hospital, and sometimes even through the town in which the hospital is situated. No doubt the effects of carbolic acid had been greatly exaggerated. It will not in every case prevent suppuration; but by protecting the raw surface of wounds from the poisoned atmosphere of the hospital, it may materially counteract the tendency of the secretions to degenerate.

Dr Watson said that while the general tone of the paper was excellent, there were several conclusions arrived at by Dr Morton to which he could not assent. With respect to the theory propounded by Lemaire, Lister, and the Antiseptic School, he (Dr W.) had read a paper during the last session of the society, in which he had given his reasons for disbelieving the atmospheric germ theory, and traced the action of carbolic acid on wounds to two causes, first, its power of coagulating albumen, and second, its effects as a volatile agent, largely composed of carbon, in uniting with the oxygen of the air, and thus saving the tissues from its action. But when, leaving the theory, they turned their attention to the usefulness of carbolic acid as a dressing, he quite agreed with Mr Lister and its other advocates as to its very great value. No doubt many in trying it had been disappointed; but they must remember that no remedy is infallible in every one case; and in this instance there were several sources of fallacy. Carbolic acid, as applied in Surgery is quite a new dressing; they had many things to learn as to the best way of using it. Even yet they were only in a transition state. The putty was a failure; the oil was not much better. The best application, as far as his own experience went, was a watery solution, or the same with spirits added. The putty applications hindered the ultimate healing of the wound; so that cicatrization was particularly slow, and the watery application will have a like effect, unless greatly weakened towards the end of the treatment. Sometimes one application succeeds admirably in one case, and fails in another apparently similar, and this without any assignable cause. On the whole, he believed that great good would result from the antiseptic movement, on whatever theory they applied it. With respect to the health of the Hospital, he could bear out Dr Ritchie's statement as to its extreme unhealthiness at the period referred to. No important wound would heal. At last the attention of the Directors was drawn to this state of matters; the pits were removed, and a good many air-holes made in the sunk flat of the Hospital, and the atmosphere made more salubrious.

Dr Morton, in reply, said that he was sorry to hear that the enthusiastic admirers of carbolic acid had abandoned the putty and the oil, and were now taking refuge in a watery solution, or a watery solution mixed with spirits. He could not conceive on what principle the putty would fail, if the efficacy of carbolic acid is such as is stated. He must also point out that to mix spirit with the acid was not putting the latter to a fair test, as the spirit itself is a good antiseptic. He was certain that during late years much greater care than formerly was bestowed upon wounds and injuries of all kinds, and the inevitable result was a very noticeable improvement in the success of the treatment.

Medical Intelligence, &c.

THE UNIVERSITY.

The Medical Classes of the University were opened on 26th ult. with an address by Professor Cowan, who, after alluding to the changes which had taken place by the death of Dr George Rainy and the removal of Professor Lister, proceeded to give a sketch of the rise and growth of the Medical School of Glasgow. He showed how its foundation was mainly due to the exertions of Cullen, aided by Black and the Hamiltons; and how for long its progress was retarded by the want of an Hospital, a want supplied at the end of last century by the establishment of the Royal Infirmary. He then traced its development, and dwelt upon the stimulus it received from the teaching of Jeffray, Thomson, Hooker, and Burns. Dr Cowan then gave an account of the extra-mural Schools,—the College Street, Portland Street, and Andersonian,—acknowledging the stimulus they gave to medical science. He alluded to the aid which the Faculty of Physicians and Surgeons had afforded to medical education,—to the advantages the School possessed from the facilities afforded for anatomical study and chemical research. In concluding, he dwelt upon the benefits which will accrue from the superior accommodation at Gilmorehill, and urged that the possession of an Arts Degree, previous to graduation in Medicine, would prove of infinite value to the cause of medical education.

Lectureship on the Eye in the University of Glasgow.—We understand that the Medical Faculty of the University have unanimously recommended Dr Thomas Reid, Surgeon to the Eye Infirmary, as successor to the late Dr George Rainy, as Lecturer on the Eye, and that the appointment will be made on 1st November.

ANDERSON'S UNIVERSITY.

The opening address in connection with the medical classes in Anderson's University was delivered by Professor Morton, 28th October. He took it for granted that the students had made up their minds to two things—first, the choice of a profession, and second, of a place of study. With regard to the profession, they had chosen one of the noblest; and if with proper motives, he would applaud them. If they had made up their minds to a life of labour composed of a rapid succession of honest efforts to benefit their fellowmen, then no reward could be too great for them. The life of a medical man was not, however, a life of ease, nor was theirs a money-making profession; but it demanded a high morality. Dr Morton then gave a historical account of Anderson's University, especially referring to the Medical Faculty. We give this portion in full, as there seems to be much justice in Dr Morton's remarks:—

"Though this Faculty is the only one of the four which can be said to be fully formed, though it has done its work well for many years, and has been the means of keeping Anderson's University before the world as an educational institution, little, almost nothing, has been done for it by the authorities of the University. Again and again it has been threatened with extinction. Interested croakers have gone about prophesying its doom, but here we find it more vigorous than ever. But though the School has done much, and I hope will do more, that is surely no reason for withholding a helping hand; and I call upon the Trustees to take this matter up without delay, and if they enter upon it with spirit and some little determination, there can be no doubt of their success. Why, we find money dropping around us on every side, but somehow it never takes the proper direction—it has never come the way of the Medical School. Many very handsome gifts have been given to us, but they do not seem to bear any fruit. Large sums have been thrown away—I use the term advisedly —upon a Museum which scarcely any one ever visits, and which may be likened to an old curiosity shop. So far as these Faculties are concerned, and, in particular, so far as concerns the Medical School, it is a dead letter. Far be it from me to undervalue museums, either as articles of utility or ornament, but they are at best expensive superfluities, and ought to be an after-consideration; that is, they should be postponed to more pressing needs."

THE FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW—1869-70.

President—Dr Andrew Anderson. *Visitor*—Dr Harry Rainy.

Councillors—The President, *ex-officio;* The Visitor, *ex-officio;* Dr J. G. Fleming (as Representative to General Medical Council); Dr John Coats; Dr Ebenezer Watson; Dr William Weir; Dr Robert Scott Orr.

Treasurer—Dr John Coats. *Honorary Librarian*—Dr J. D. Maclaren. *Vaccinator*—Dr James Dunlop.

Board of Examiners—Dr James Morton, Surgery and Surgical Anatomy; Dr Robert Perry, Chemistry; Dr R. D. Tannahill, Midwifery and Medical Jurisprudence; Dr J. B. Cowan, Medicine and Materia Medica; Dr Andrew Fergus, Chemistry; Dr George Buchanan, Anatomy and Physiology; Dr R. Scott Orr, Medicine and Materia Medica; Dr William Leishman, Midwifery and Medical Jurisprudence; Dr William Lyon, Surgery and Surgical Anatomy; Dr Eben. Watson, Anatomy and Physiology.

Clinical Examiners—The Physicians of the Royal Infirmary, on Medicine; The Surgeons of the Royal Infirmary, on Surgery.

Examiners in Arts—Dr John Coats; Dr James Steven.

Laurence Hill, LL.D., and William Henry Hill, *Clerks.*

Alexander Duncan, B.A., *Secretary and Librarian.*

GLASGOW SOUTHERN MEDICAL SOCIETY.

At the twenty-sixth annual meeting of the Glasgow Southern Medical Society the following gentlemen were elected office-bearers for the ensuing session, 1869-70:—*President*—James Morton, M.D. *Vice-President*—Robert W. Ronald, M.D. *Treasurer*—William Wotherspoon, Esq., Surgeon. *Secretary*—Robert W. Forrest, M.D. *Seal-Keeper*—Edward M'Millan, Esq., Surgeon. *Court Medical*—James Stewart, M.D. *Conveners*—H. R. Howatt, M.D.; Alexander Paterson, M.D.; William Rice, M.D. *Officer*—Thomas Robertson.

GLASGOW MATERNITY HOSPITAL QUARTERLY REPORT.

From June 15th to September 15th, 1869.

From the subjoined table it will be observed that no death has occurred in the Hospital during the quarter, and only one among the out-door patients. For a considerable time past the Hospital has been in a very healthy condition. The means adopted for keeping the atmosphere salubrious are—thorough cleanliness, perfect ventilation in every ward, fumigations by carbolic acid vapour, and, in cases of offensive vaginal discharges, injections of tepid water, with carbolic acid. No circumstance connected with the abnormal cases requires special notice.

The fatal out-door case was one of placenta praevia. The patient was greatly exhausted by hæmorrhage, which had occurred repeatedly for several weeks before her confinement. She was safely delivered of a still-born child, and progressed favourably for four days. Feeling herself well, she got out of bed, contrary to instructions, had a rigor, gradually sank, and died apparently from exhaustion, on the ninth day after delivery.—R. D. T.

MOTHERS.					INFANTS, &c.												Maternal Death.
	No.	Social Condition.			No.	Males.		Females.					Presentation.		Operative Cases.		
		Married.	Widows.	Single.		Alive.	Still-born.	Alive.	Still-born.	Twins.	Premature.	Abortion.	Normal.	Abnormal.	Forceps.	Version.	
In-door	86	19	7	60	87	49	2	33	3	1	3	0	79	8	1	2	0
Out-door	191	162	6	23	196	82	11	81	10	4*	9	2	185	11	3	2	1
Total.....	277	181	13	83	283	131	13	114	13	5*	12	2	264	19	4	4	1

* 1 triplet case.

Average weight of child at full time over 83 cases,	7 lbs.
" length " " "	17·5 inches.
" weight of placenta " "	1·39 lbs.
" length of cord " "	24·3 inches.

Average Duration of Labour over 86 cases.

Primiparæ (35 cases).	Multiparæ (49 cases).
1st stage 10·59 hours.	1st stage 6·4 hours.
2nd " 1·65 "	2nd " 1·1 "
3rd " 8·02 minutes.	3rd " 12 minutes.

Greatest weight of child at full time,	10 lbs. 2 oz.
Least " " "	4 "
Greatest length " "	21 inches.
Least " " "	14 "
Greatest weight of placenta, - -	2 lbs.
Least " " - -	½ "
Greatest length of cord, - - - -	39 inches.
Least " " - - - -	14 "

APPOINTMENTS.

The University.—GEORGE H. B. MACLEOD, M.D., Professor of Surgery, Anderson's University, appointed Professor of Surgery, *vice* Mr Lister, resigned.

JAMES ST CLAIR GRAY, M.B., appointed Assistant to the Professor of Medical Jurisprudence.

Anderson's University.—JAMES DUNLOP, M.D., appointed Professor of Surgery, *vice* Dr MacLeod, resigned.

Royal Infirmary.—GEORGE BUCHANAN, M.D., Professor of Anatomy, Anderson's University, appointed Surgeon, *vice* Mr Lister, retired in rotation.

THOMAS M'CALL ANDERSON, M.D., Professor of Practice of Medicine, Anderson's University, appointed Physician, *vice* Dr Leishman, resigned.

JOSEPH COATS, M.B., appointed Pathologist and Curator of Museum, *vice* Dr S. J. Moore, resigned.

HECTOR C. CAMERON, M.D., appointed Extra-Surgeon to Dispensary.

ALGERNON W. SMITH, M.D., appointed Extra-Physician to Dispensary.

P. H. M. M'KELLAR, M.A., M.D., appointed Extra-Resident Physician, City of Glasgow Fever Hospital.

CHARLES ARROL, M.B., appointed Assistant Resident Physician, Town's Hospital, *vice* Dr M'Kellar, resigned.

WILLIAM L. REID, M.B., appointed Medical Officer to the Anderston District, Barony Parish.

WILLIAM DOUGAN, M.B., appointed Medical Officer and Public Vaccinator, Kilmichael District of Glassary Parish, Argyllshire, *vice* Dr Hugh Jackson, deceased.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Ueber sympathische Gesichts-störungen von Dr med. Albert Mooren, dirigirendem Arzt der städtischen Augenklinik zu Dusseldorf. pp. 170. Berlin: Hirschwald. 1869.

On External Perineal Urethrotomy, &c., &c., with remarks on the Preparatory and After-treatment. By J. W. S. Gouley, M.D., Prof. of Clinical Surgery, University of New York, (reprinted from the *N. Y. Medical Journal)*; pp. 32. New York: D. Appleton & Co. 1869.

Compulsory Vaccination. An Enquiry into the present unsatisfactory condition of Vaccine Lymph, and a Remedy proposed. By Henry Blanc, M.D., Superintendent of Vaccination, Western Circle, Bombay; pp. 32. London: Churchill. 1869.

Report on Excision of the Head of the Femur for Gunshot Injury; pp. 144; illustrated. Washington: Government Printing Office. 1869.

On the Influence of a Digestive Habit in the Production of Tuberculosis, and the Indications of Treatment drawn therefrom. By David J. Brackenridge, M.D., Physician to the New Town Dispensary, Edinburgh; pp. 20. Edinburgh: M'Lachlan & Stewart. 1869.

A Contribution to the Theory of Diathesis. By the same; pp. 24. Edinburgh: M'Lachlan & Stewart.

On the Presence of Sulphocyanides in the Urine. By Arthur Leared, M.D. (Reprint from *Proceedings of Royal Society).*

Introductory Address delivered at the Liverpool Royal Infirmary School of Medicine, October 1st, 1869. By Alexander Davidson, M.A., M.B., Lecturer on Comparative Anatomy, &c.; pp. 16. Liverpool: Adam Holden. 1869.

The Medical Gazette. New York.

Le Mouvement Médical, Annales de L'Hydrotherapie Scientifique, paraissant tous les dimanches. Paris.

La Santé Publique, Hygiéne et Medicine Populaires, &c. Paris.

THE

GLASGOW & WEST OF SCOTLAND MEDICAL ASSOCIATION.

ANNUAL MEETING.

The Annual Meeting of the Association was held in the Faculty Hall, 242 St Vincent Street, Glasgow, on the 15th October, at Four p.m.—Dr Weir, Vice-President, in the chair.

The minutes of previous meeting having been approved, the Secretary read the *Annual Report of the General Business Committee of the Association for the year ending 30th September*, 1869, which was to the following effect—

"In accordance with the Regulations of the Association, the General Business Committee beg to present their Annual Report for the year ending 30th September, 1869.

"They met for the first time, 15th May, 1868, instructed in terms of the minute of the Association, to 'proceed with the publication of the *Journal* as soon as they had raised the membership of the Association to from 250 to 300.' On the 28th August, they found themselves in a position to appoint an editorial committee, and to receive estimates for the printing of the *Journal*. The contract made with Messrs Dunn & Wright seemed a very favourable one, and the workmanship of the *Journal* has been well executed. The publication of the first number was greatly delayed, by the necessity of beginning *de novo* in all respects, without a basis, either as to the form and external appearance of the *Journal*, or as to the literary department. In the course of these and subsequent deliberations the Committee met eight times.

"Having issued the first number of the *Glasgow Medical Journal*, the chief aim of the Committee then was to push it into notice, and obtain for it a wide circle of readers, believing that liberality in the first year of its existence would be judicious. With this end in view, above 60 copies of the first number were sent gratis to various libraries and reading-rooms, and to the principal medical periodicals at home and abroad. The result to some extent was attained in the subscribing of several libraries, and the effecting of exchanges with the leading Medical Journals in all parts of the world. The latter result is peculiarly valuable, as it both opens up to contributors a circulation of practically unlimited extent for their papers, and will enable the Editorial Committee to enrich the pages of the *Journal* by abstracts, especially from the two valuable German publications which exchange with us.

"The number of guaranteeing-members originally was 72, and of non-guaranteeing 227. In accordance with No. 8 of the Association's Regulations, it is the duty of the Committee to report that 2 guaranteeing and 15 non-guaranteeing members have failed to pay their subscriptions. All received the statutory notice of arrears, and were besides written to individually by the Secretary, but without eliciting any kind of reply. The following is a list of those 17 defaulting members :—

* * * * * * * * * *

Each of these persons received the first two numbers of the *Journal*, but it was not sent thereafter.

"Although this defect in the payment of subscriptions implies a loss to the Association of about £10, the Committee are happy to congratulate the Association on the considerable balance remaining in the hands of the Treasurer. This result is peculiarly gratifying in the first year of the new series of the *Journal*, when the preliminary expenses, which will not again occur, must be met. The Committee have also been more liberal with their contributors than has been usual hitherto, in publishing elaborate tabular matter, the expense of printing which is considerable, and in bearing, to some extent, the cost of wood-cuts. The thanks of the Association are due to Dr Thomas Reid, for the well-executed copperplate engravings appended to his paper on *Alopecia areata*, which were engraved at his own charge solely for the *Journal*.

"During the year the following Members of the Association have died:—Dr William Young, Chapelhall, Airdrie; Dr George Robertson, Glasgow; Dr George Rainy, Glasgow.

"The loss of Dr George Rainy the Committee regard as one which very deeply affects the interests of the Association. They selected him as one of the Editorial Committee, and his assiduous services in that Committee as well as the substantial contributions which he gave to the pages of the *Journal*, fully justify their opinion that the Association could hardly have sustained a more serious loss.

"By the death of Dr George Rainy, and the removal of Mr Lister to Edinburgh, two vacancies are caused in the Committee.

"Having by this Report discharged the duties imposed upon them, the Committee have only to say, with regard to the future of the Association, that they hope every member will endeavour to add to the list of its supporters, and at least maintain their present numbers, if possible, increase them. There can, in that event, be no doubt whatever of the entire and continued success of the Association, and of the *Journal*, which it is their chief object to support.

"The Report of the Editorial Committee is appended.

"REPORT OF EDITORIAL COMMITTEE.

"The Committee have met with considerable regularity weekly since their appointment. Of the business transacted at these meetings no extended report is necessary, as its chief results have been presented to the Association quarterly in the *Glasgow Medical Journal*. One or two matters may, however, be specified more particularly.

"1. They are happy to report that, although naturally enough, some difficulty was at first experienced in the providing of matter fitted for the *Journal*, that difficulty is no longer felt. Indeed, it is now in advance of present requirements, and, consequently, they will be enabled to improve the standard of the articles.

"2. The circulation of the *Journal* during the first year has been as follows:

To Members, - - - - - - -	282	Copies.
Sold to Libraries and Booksellers, - -	10	"
Exchanges, - - - - - - - -	27	"
Supplied gratis to Students' Reading Rooms,	2	"
Do., Schmidt's Jahrbucher, -	1	"
To Libraries under the Copyright Act, -	6	"
Total, - - -	328	"

"In addition some 25 copies of separate numbers in all, were sold from time to time to non-subscribers by Messrs Dunn & Wright. The two first numbers were sent to 17 members who did not pay their subscriptions. Those only who paid are included in this statement.

"3. The Committee have endeavoured to obtain for the *Journal* a wide notoriety, by extending the list of Exchanges, of course with the concurrence and permission of the General Business Committee. In this way they can promise for contributors of papers of value, a circle of readers extending beyond the membership of the Association, to all parts of the world. The Committee have been pleased to observe abstracts and quotations from the pages of the *Journal* in nearly all the foreign Journals with which they exchange. One of our original articles has been reprinted in full in a German Journal, and fully abstracted in a French one. They mention these facts that contributors may be encouraged to entrust their best papers to this *Journal*, with the certainty that they will not be buried, if entitled to expect a better fate.

"4. For the future your committee have already good prospects of maintaining a high literary standard in the pages of the *Journal*. They have obtained promise of valuable papers for subsequent issues.

"(Signed) J. B. RUSSELL, *Secretary*."

The Treasurer then submitted his financial statement, from which it appeared that the income from Subscriptions was £172 13s 6d; from Advertisements, £9 11s 0d, in all £182 4s 6d. The total expenditure had been £158 3s 1d, leaving a balance in his hands of £24 1s 5d. The Treasurer's intromissions had been examined and certified correct by Drs Weir and M'Call Anderson.

The meeting then proceeded to the election of Office-Bearers for the ensuing year. The result was as follows:

President—Prof. ALLEN THOMSON.
Vice-Presidents—Dr WEIR and Dr J. G. FLEMING.
Treasurer—Dr STEVEN. *Secretary*—Dr RUSSELL.

General Business Committee.

PRESIDENT.
VICE-PRESIDENTS.
TREASURER AND
SECRETARY.
} *Ex officiis*
Dr SCOTT ORR.
Dr DUNLOP

Dr GAIRDNER.
Dr LEISHMAN.
Dr M'CALL ANDERSON.
Dr EBEN. WATSON.
Dr THOMAS REID.
Dr HUGH MILLER.

Dr **Gairdner** then moved that the cordial thanks of the Association be awarded to the Treasurer, Dr Steven, and to the Secretary, Dr Russell. The very favourable result of their first financial year bore sufficient testimony to the way in which the Treasurer had discharged his duties; while as Secretary, and also as working editor of the *Journal*, Dr Russell had expended much time and labour in their service.

Dr **Watson** had great pleasure in seconding Dr Gairdner's motion.

The motion was carried by acclamation.

LIST OF EXCHANGES.

Great Britain.—The Half-yearly Abstract of the Medical Sciences, London.
Braithwaite's Retrospect of Medicine, London.
The Journal of Mental Science, London.
Journal of Cutaneous Medicine, London.
Transactions of the Obstetrical Society, London.
Medical Press and Circular, London.
Medical Mirror, London.
Edinburgh Medical Journal, Edinburgh.
Dublin Quarterly Journal of Medical Science, Dublin.

British Colonies and Possessions.—Canada Medical Journal, Montreal.
The Australian Medical Journal, Melbourne.
The Indian Medical Gazette, Calcutta.

American.—The American Journal of the Medical Sciences, Philadelphia.
New-York Medical Journal, New-York.
The Medical Record, New-York.
The American Journal of Obstetrics and Diseases of Women and Children, New-York.
Half-yearly Compendium of Medical Science, Philadelphia.
The Medical and Surgical Reporter, Philadelphia.
California Medical Gazette, San Francisco.
The Chicago Medical Times, Chicago.

French.—La Lancette Française—Gazette des Hopitaux Civils et Militaires, Paris.
Bulletin Général de Thérapeutique Médicale et Chirurgicale, Paris.
Gazette Médicale de Paris, Paris.
Annales Medico-Psychologiques, Paris.

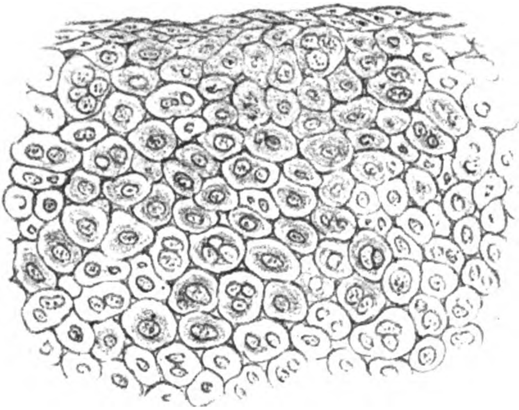
German.—Archiv für pathologische Anatomie und Physiologie, &c. Herausgegeben von Rudolf Virchow, Berlin.
Archiv für Anatomie, Physiologie, &c., Herausgegeben von Dr Reichert und Dr Du Bois-Reymond. Leipzig.

Turkey.—Gazette Médicale d'Orient, publiée par la Société Imperiale de Médicine de Constantinople.

All Exchanges to be sent to the care of Dr **Russell**, 278 Bath Street, Glasgow.

DUNN AND WRIGHT, PRINTERS, GLASGOW.

1' $\frac{500}{1}$



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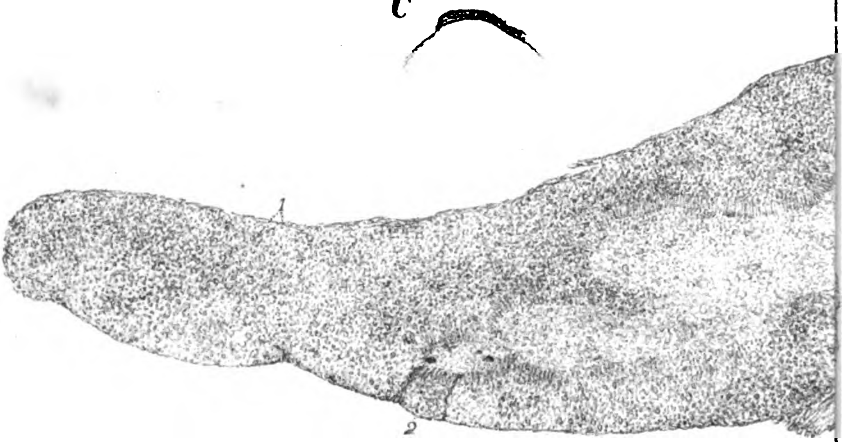

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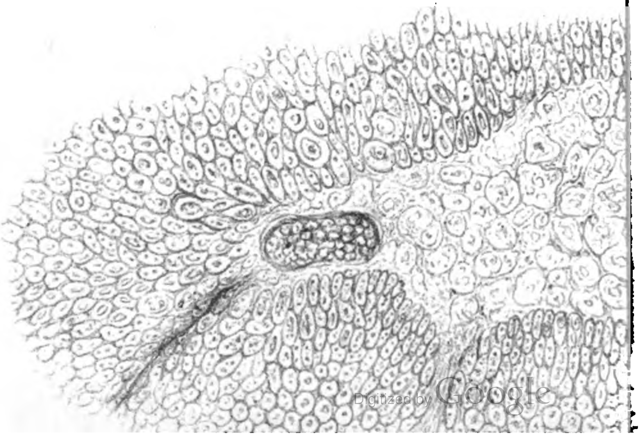

DESCRIPTION OF PLATE.

(*A*) Front view of the eye, showing the position and relations of the growth.

1 Healthy cornea.
2 Tumour with the line of section indicated.
3 Vascular band on sclerotic.

(*B*) Vertical section of tumour.

1 Opaque margin of thickened and altered epithelium.
1′ A portion of the same highly magnified.
2 The limit of the vascular and discoloured part of the growth.
2′ The same more highly magnified, showing two large vascular channels.
3 The deepest layer of the growth, and which adhered to the anterior elastic lamina.
3′ A portion of the same more highly magnified, showing the transition from connective tissue at its upper part, to pseudo-corneal tissue at its lower.
4 Dense layer of epithelium, with vascular papillæ (6).
5 Vascular layer.
6 Papilla.
6′ The same highly magnified.
6″ A portion of the same still more highly magnified.
a Vascular channels with large granular nuclei interspersed.
b Epithelium. The white bands indicate the transition from connective tissue to epithelial.
7 & 8 Indicate large vascular channels.
9 A mass of large cells, which appear to have replaced the tumour first removed, situated immediately above the corneo-sclerotic junction.
9′ The same more highly magnified, consisting of (*a*) layers of epithelium and (*b*) large encapsulated cells.
10 Sclerotic conjunctiva.

(*C*) Diagrammatic view of the size and position of the growths.

THE

GLASGOW MEDICAL JOURNAL.

February, 1870.

Original Articles.

I.—CLINICAL NOTES ON EPITHELIOMA.

By THOMAS REID, M.D., *Lecturer on the Eye in the University of Glasgow, Surgeon to the Eye Infirmary.*

THE following notes on epithelioma refer chiefly, though not exclusively, to this disease as it occurs in the eyeball and its appendages—the eyelids, &c., and principally with the view of giving accurate and detailed sketches of the morbid products and their anatomical relations to the adjacent tissues. In a disease such as this, where there is considerable diversity of opinion as to its origin, development, and true character, it is very desirable that an accurate distinction should be drawn between the primary and secondary products, between the true cancerous structure and cancerous infiltration of an otherwise healthy structure. Another question of considerable importance is whether epithelioma, wherever it makes its appearance, always has a uniform and invariable histological character, whereby it can be distinguished from other morbid products; or, on the contrary, presents all the varieties of structure seen in other tumours, passing insensibly into and undistinguishable from them.

In order to arrive at definite conclusions on these and other points, it is absolutely necessary that the diseased structure should be examined in its early and later stages; because it is just possible that what has been hitherto recognised as epithelioma may originate indifferently in the dermic and sub-dermic tissues, varying in histological character and degree of malignancy, having this, however, in common, that in whatever tissues it originates it invariably leads to progressive ulceration, and, unchecked, ends in death.

The scope of these notes forbids lengthened discussion of the recent and conflicting views of Virchow, Thiersch, Waldeyer, Köster, &c., further than will naturally be suggested in the clinical and pathological descriptions. Indeed, the time has not arrived, and well-ascertained facts are too few, to admit of definite conclusions being drawn as to the nature and origin of this disease. These notes, then, are intended rather as contributions to the study of epithelioma, drawn from the practice of the Glasgow Eye Infirmary and other sources during the last ten years.

The following case is interesting on account of its rarity and purely epithelial origin.

Kenneth Mathieson, fisherman, aet. 48, was admitted as a patient to the Glasgow Eye Infirmary on the 16th Sept., 1865, with what appeared at first sight to be a large vascular ulcer of irregular outline, occupying nearly two-thirds of the area of the cornea of left eye. This structure was of a dark brown colour, and bounded by a greyish-white margin of about half a line in breadth, and slightly raised above the level of the surrounding healthy cornea. The growth appeared to have originated at the outer corneo-sclerotic junction. From this point a broad vascular band, resembling a pterygium, extended as far back as the outer canthus, and had a direct communication with the vascular portion of the growth. In addition to this vascular band the circumcorneal vessels were greatly enlarged, and at various points branches traversing the transparent cornea entered the tumour, notably one large branch from the superior rectal vessels. History:—The growth made its appearance at the outer margin of the cornea six years previous to his admission, and three years after was removed. It soon recurred, gradually assuming its present appearance and magnitude, and from its position completely obscuring the vision. (See Fig. A.) The patient was submitted for consultation to the late Dr M'Kenzie, who pronounced it to be a case of epithelioma of the cornea, and advised its removal. The patient having been put fully under the influence of chloroform, I transfixed the vascular band at a short distance from the margin of the cornea, and not being quite sure how far the deeper tissues were affected, separated the tumour carefully from the subjacent healthy tissues. There was considerable hæmorrhage, chiefly from the vessels in the ciliary region. After removal of the tumour, it was evident that the corneal tissue had not been affected, and it presented the appearance simply of an extensive epithelial abrasion. On the third day the epithelium was entirely reproduced, and the vision perfect. The enlarged circumcorneal vessels had shrunk, and the appearance of the eye was normal.

The tumour after removal was soft and friable, but on immersion in chromic acid was found to cut like a chondrinous substance. A vertical section through its entire thickness, and in the direction of the line in Fig. A., presented the following appearances:—1. A dense layer of epithelium. (Fig. B. 1, 4, 6 and 9.) 2. A connective tissue highly vascular. (Fig. B. 5, 7 and 8.) 3. Pseudo-corneal tissue. (Fig. B., 3.) The epithelial layer consisted of three distinct structures. Opposite the margin of the cornea a mass of large, loose cells, containing frequently more than one nucleus, and occasionally encapsulated cells (9 and 9'). This mass probably occupies the site of the tumour removed at the first operation. The centre, corresponding to the discoloured part, had numerous papillæ (6); and lastly, the opaque margin composed of corneal epithelial cells, also frequently encapsulated. (1 and 1'). The vascular portion was almost entirely composed of a loose network of vessels with very thin walls closely allied in structure to naevus tissue, with the addition, however, of large granular cells of a rather suspicious character. The deepest layer resembled the early condition of the cornea, containing nuclei, &c.

What may have been the nature of this tumour is not so easy to determine. The opinion of the late Dr M'Kenzie, as we have seen, was in favour of its cancroid character. The great increase and altered appearance of the epithelial cells seemed to favour this view. On the other hand, the intense vascularity and dark brown colour of the tumour presented a very close resemblance to the early condition of what Virchow calls cutaneous melano-sarcoma of the eyeball, and of which he has given a figure.* The presence of a pseudo-corneal tissue, unconnected with the true corneal substance, is quite in accordance with what we know of morbid growth in other tissues. As the patient has not returned at this date, it is not known whether or not there has been any recurrence of the disease.

Tumours of the cornea are not by any means common. Dr M'Kenzie, in the last English edition of his work, quotes a case from Travers in which the tumour covered the whole cornea. The anterior half of the eyeball was excised. "On examination of the tumour, the cornea and sclerotica proved to be entire, and the morbid growth lying upon and adhering to the cornea, and a small portion of the sclerotica, had acquired the [lobulated] appearance, as if by degeneration of the investing conjunctiva." P. 253. In the last French edition of the same work, another case is recorded from the ophthalmic institute of Brabant. It was excised in 1853, and in this case also the corneal tissue was not affected. The tumour was of a melanotic character, and recurred in two years. In 1845 the translator saw a female in London who had been operated on by White Cooper for a melanotic tumour of the conjunctiva situated at the junction of the cornea and sclerotic. It had not returned at the above date. The case was published in the December number of the *London Medical Gazette*, 1842.† Three cases of cancroid of the cornea are recorded by Wecker.* Two from the practice of Von Gräfe, and reported in the *Archiv für Ophthalmologie*, Band VII. The tumours, after excision, were examined by Virchow, who found the characteristic encysted cells peculiar to epithelioma; one recurred within a year. The third occurred in the practice of M. Sichel, in 1859, and was seen and examined by Wecker. In all these cases the tumours originated in the ocular conjunctiva, and at the junction of the cornea with the sclerotic.

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* *Krankhaften Geschwülste*, Vol. II., p. 279.

† *Traité Pratique des Maladies de l'œil.* 4th Edition. Translated by Warlomont and Testelin.

(To be continued.)

II.—ON EPIDEMIC SCARLET FEVER.

By DAVID EASTON, B.A., M.D., *Stranraer.*

THE following remarks are a record of observations made by me on scarlet fever as it occurred epidemically in this town and neighbourhood about eighteen months ago. Many opportunities of observation were afforded me, for, during the period of the epidemic, I treated upwards of three hundred cases. My experience as a practitioner may be of some value to my professional brethren, and with deference and respect I beg to submit it to their consideration.

The history of epidemics is always interesting to the physician, and it is of special value as showing not only the changing character of the disease, but also the consequent change in the treatment of it. This is emphatically true of scarlet fever, than which there is no affection that more thoroughly tests the resources of our art, or more frequently fills the mind of the physician with anxiety, or oftener disappoints by its sudden and unexpected result. It is of the last importance for the physician to make himself thoroughly conversant with the special tendencies of any particular disease or type of disease, for it is only in accordance with the extent and accuracy of his knowledge of these tendencies that he will be prepared to treat successfully the various symptoms which in its course the disease may successively display. There is no better way of acquiring this knowledge than by carefully noting the circumstances and facts of one epidemic, and then comparing them with the corresponding circumstances and facts which may have been recorded respecting former epidemics of the same affection. One epidemic of scarlet fever may not only vary much in character from another, but it may assume, at different periods of its own course, all the possible forms of that disease, from the simplest varieties demanding little interference, down to the most malignant type from which recovery is the rare exception. When the epidemic fever extends over a whole country, it rarely maintains throughout its course the same character. In one part it may scarcely exist at all, or only in its mildest form; in another, the inflammatory type may prevail; while, in a third, the disease from the first may be of the gravest character, resembling in its ravages more a plague than a fever, extending to all classes and sweeping away whole families; or it may, in the same locality, at different periods, have assumed each of the above-mentioned types.

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* *Etudes Ophthalmologiques.* p. 196.

It is evident then that the treatment, if properly conducted, must also vary. Those remedies that are successful in the milder and inflammatory forms, will altogether fail if administered in the worst types of the disease. It is because this fact is overlooked that some remedies are held forth as specifics for scarlatina, while others are altogether thrown aside as useless. It cannot therefore fail to prove most disastrous to the patient, and hurtful to the physician, if he adopt and administer the same remedies in all cases, and this even while the *constitution* of the disease is ever changing. It will be equally injurious and disappointing if he adopt any new plan of treatment without first seriously "weighing the principles upon which that treatment rests," at the same time that he carefully considers the type of the fever and its natural tendency. This is a point to be remembered by the young physician, who is apt to be misled by his success or failure in the cases in which the remedy has been administered. It is a great mistake for the physician to adopt in all cases of the fever a routine practice, even although it may have been attended by success in some cases. It will even sometimes be judicious for him to discard altogether his former mode of treatment, although proper at the time and in accordance with what he had been taught to adopt, and to have recourse to a totally different plan of treatment, suggested by the different character of the affection.

There is little doubt that the scarlet fever of to-day differs in many respects from the scarlet fever of a former time. At all events, the bleeding, purging, and blistering said to be followed by the happiest results, even in the severest types of former epidemics, would prove very injurious if prescribed and adopted in similar types of the fever now. When antiphlogistic treatment, even in a very modified form, was had recourse to in those cases which seemed to demand it, the result was doubtful. Without alleviating the urgent symptoms much, such treatment was sometimes followed by failure of the vital powers, and that at a time when it was of the highest importance that these should be sustained. Even the recovery of these cases was often much protracted, and the patient was so much prostrated as to occasion no little anxiety to friends, and to demand the utmost watchfulness and the most careful management to restore him again. And besides, the patient, in his weakened state, was for a time more liable to be attacked by some other malady. Medicinal agents of a depressing kind were therefore never indicated, at least in the severer forms met with in the progress of the epidemic. The mere urgency of the symptoms was not to be regarded as requiring the adoption of depletory measures.

The fever made its appearance in this district upwards of two years ago. At first it was mild and existed only in a sporadic form. Nine months afterwards it became more general, and assumed its epidemic character; but even then the cases, although numerous, were of an exceedingly simple kind, so much so that I attended upwards of fifty cases before a death occurred. But in the beginning of August, 1868, suddenly, and without any apparent cause, it became most malignant, and in many instances rapidly fatal. Throughout August, September, and the first half of October, the fever maintained its virulent type. But from that time the cases gradually diminished in number and assumed a less serious character, till in January following very few cases were to be met with, and these only in country districts.

Mode of Attack.—The fever in the majority of cases was ushered in by its usual symptoms, either congregated together as it were, or following each other in a fixed order in rapid succession; while in the remaining cases the usually prominent and characteristic symptoms were scarcely observed or altogether awanting. This remarkable variety of symptom is not uncommon in epidemic febrile affections. It is of great importance, both in a diagnostic and practical point of view, for the physician to bear this fact in mind; for he is thereby the better able to discover the true nature of the affection even prior to the appearance of the determining symptoms, to prepare for the after-treatment of the case, and early to adopt the proper precautionary measures against the spread of the disease. The primary symptoms were either mild and came on gradually, or they were severe and sudden. Many a child was seized while asleep or at play. In the former case the eruption was sometimes the first thing to attract attention, or the patient complained of slight sore throat and pyrexia only, which gradually passed away without any other symptom of the fever manifesting itself, and which, under other circumstances, would have been regarded as a simple *cynanche tonsillaris*. It is desirable, therefore, to examine the throat early, in order to discover the angina which in a greater or less degree always precedes or accompanies the fever. In the cases to which I refer the disease was generally throughout of the mildest character. But in another class of cases the patient was suddenly and violently attacked, sometimes with severe rigors and violent headache and vomiting, and high temperature of skin and very severe sore throat; and occasionally the fever at the outset simulated an attack of cholera. In three cases the disease was ushered in by violent head symptoms. The gravity of the fever was, as a rule, proportionate to the suddenness and violence of the early symptoms, although I have seen not a few cases which exhibited for the first two or three days symptoms of the mildest character, and afterwards assumed a very serious type.

The Rash.—The time at which the rash appeared I have found to vary from one to three days. In most of the cases it made its appearance in some parts of the body within twenty-four hours after the fever of invasion; in some as early as the first and second hours: while in others it did not show itself till the third or fourth day. It usually began to fade about the fourth or sixth day, but in some it remained bright till even the tenth. There was another class of cases, however, in which the rash either suddenly disappeared or changed its character. These were of a more serious kind, and required immediate attention. The character of the eruption was far from being uniform or constant. So different was it in instances, and those numerous, that one was almost obliged to conclude that different specific poisons were at work producing such a variety of spots. Even among members of the same family, under the same roof, suffering at the same time, from the same fever, almost every variety of the eruption was exemplified. In some cases the eruption was discrete, presenting a great multitude of minute round red spots, quite separate from each other, which were generally found only on one part of the body, such as the thighs, knees, &c. This form of the disease was invariably of a mild type. In others the rash was continuous, not broken into spots, but the whole surface of the body appearing as if it had been dyed with one colour. The eruption in most cases presented this character. It has been asserted that when the rash is vivid and well out the fever is more likely to terminate favourably. No doubt a suppressed or imperfectly developed eruption is not a thing to be desired; but I have always observed that, *cæteris paribus*, the symptoms were more serious, and the prognosis more unfavourable in proportion to the abundance and extent of the eruption.

Very often this confluent form of rash was found mixed up with a sort of miliary eruption, consisting of countless minute vesicles, which soon became filled with an opaque fluid, giving to the skin a rough appearance. In two cases an eruption like small-pox was combined with the scarlatina rash. These coincidences in no way affected the prognosis. In some cases again the eruption appeared in the form of bright and well-defined purple patches, chiefly about the knees, elbows, and wrists, varying in size from a pin-head to a large pea. Occasionally I have found this form combined with spots that could not be distinguished from the maculae of bad typhus. I have also found the purpuric spots, great patches of redness of different hues, and universal redness of the entire surface, all mixed together in one patient. To what cause such a variety of eruption, the result of the same poison, is to be attributed, I am unable to say; no doubt there is something in the organisation itself which in some persons tends to modify the action of the poison; and although we are unable to state what that something is, yet it is of the highest importance, in a prognostic point of view, to watch closely the different forms and appearances which the rash assumes, for we may then be able, with some degree of certainty, even in the early stage of the fever, to foretell the result; and, therefore, also in some measure to prepare the family for it. The brighter and less confluent the rash, the smaller the spots, and the more naturally and gradually the rash faded, the milder as a rule did the fever turn out to be. When the rash suddenly receded, or assumed a darker hue, or coalesced into larger spots, the fever always put on a more serious aspect. The larger and darker the spots and the patches were the more unfavourable was the prognosis. The large dark patches occurred only in the very malignant forms, from which there was seldom a recovery; the patient dying poisoned, and in rare cases from passive haemorrhage. The nervous system seemed to feel the effects of the poison most. With the darkening of the spots, the cerebral disturbance increased.

Temperature of Skin.—The temperature of the skin varied exceedingly in different cases. In those in which there was no eruption, or in which it was partial and natural in size and colour, or it general over the whole body, not confluent, the temperature was never very high, and began to fall about the third or fifth day, and continued to do so till it was natural. These cases were always of a mild kind. In those cases again in which there was a very copious confluent and normal rash, the temperature was very high for the first few days, but it began to fall about the fifth or sixth day. This, the earliest symptom of improvement, was first observable in the morning and forenoon; and if the temperature continued gradually to fall, excepting slight increase of temperature in the evening, the patient as a rule did well. In a third class of cases there was violent excitement of the circulating system, and extraordinary heat of skin, the pulse ranging from 140 even to 170, and the temperature being considerably above 100°. This form of the disease I always regarded as most serious. The continuance of a high temperature rendered the prognosis very unfavourable; while a fall in the temperature was invariably accompanied by improvement, which was permanent if the temperature did not again rise. A sudden rise in the temperature I always regarded with anxiety. When it occurred early in the disease, it was usually the precursor of some new complication; as, for example, rapid enlargement of the glands of the neck; or it was followed by an aggravation of the general symptoms. When it took place later in the affection, say from about the tenth to the twentieth day, or even later, it was frequently due to some incipient disease of the kidneys or other internal organ. A careful examination of the patient's urine will frequently disclose the cause.

Pulse.—The same remarks may be applied to the pulse which were made in regard to the temperature of the skin. An increase of the temperature of the skin was almost always accompanied by acceleration of the pulse, and *vice versa;* and sudden alterations of the one were equally important with sudden alterations of the other in modifying the prognosis. The gravity of the case was in proportion to the rapidity of the pulse. There were exceptional cases, however, in which the temperature and the pulse did not coincide. One of the most serious symptoms that can occur during the progress of the malady is a falling temperature, and a weak pulse rapidly increasing. This I have observed only in the advanced stage of the most malignant types. There may, however, be a comparatively slow pulse, accompanied by urgent symptoms chiefly of the nervous system. I have met with a considerable number of such cases, but I have found them much more amenable to treatment than when similar symptoms were accompanied by a quick pulse. In some cases again the pulse was unnaturally slow. In these, too, the prognosis was not unfavourable, although I have met with one or two marked exceptions.

Tongue.—The appearance of the tongue forms a valuable guide to the diagnosis. One is sometimes able from its appearance alone, and before the rash is visible, to ascertain the nature of the malady. The tongue does not, however, as a rule, put on its characteristic appearance till about the second or even the third day. Its centre will then be found to be covered with a yellowish white fur, with a few red points shining through, giving the tongue an appearance similar to that of a white strawberry; and the edge of the tongue is red, showing also that the minute elevated papillæ are apparently affected with the same exanthematous redness as the skin. The tongue daily gets redder and cleaner, till about the fifth or sixth day, when it is quite clean and studded thickly over with the elevated papillæ; but it is sometimes swollen and painful. A day or two later it is smooth, dry, and raw. Afterwards it begins to recover gradually its natural colour, its epithelium, and its moisture. When the tongue suddenly dries, or when it becomes brown and parched, there is always a rapid aggravation of the other symptoms. I have met with several cases, in which, even within a few hours, death followed this sudden change of the tongue. A sudden drying of the tongue, or any sudden change upon it for the worse, must always be regarded as a most serious symptom, demanding a guarded prognosis.

Throat and Glands.—Whatever form the disease assumed, the throat was always more or less affected. In the mild types the tonsils and fauces were slightly reddened or congested, and the neighbouring parts exhibited the characteristic erythema. In S. anginosa they were more congested, swollen, and of a darker hue, and occasionally there were little white patches and ulcers interspersed over them. But in the more malignant form the tonsils and fauces were much enlarged, of a dark red, and covered more or less with spreading and sloughing ulcers, discharging offensive and dirty-looking matter. Sometimes they were covered with large diphtheric patches, extending to the neighbouring parts and into the larynx. In some of the worst forms the back part of the throat only seemed congested, but dry, and of a deep brown colour. The glands of the neck exhibit every degree of enlargement, from slight swelling of the submaxillary and parotid to the disfigurement of the countenance by their enormous size. The earlier in the fever the swelling occurred, the more serious was the prognosis; and if the muscles of the neck became involved, the case was always of the gravest character. If the enlargement did not show itself till about the eighth or tenth day there was every prospect of a favourable termination to the case. The glandular swelling in the large majority of the cases ended in resolution, and sometimes in what is the next best, suppuration; while in the severest types it had a tendency to continue hard and boggy to the touch. In one case the whole cellular tissues of the neck sloughed away, leaving the muscles and blood-vessels clean and bare, as if newly dissected with a scalpel.

Delirium.—In all cases of the fever, except perhaps in its very mildest forms, the nervous system was more or less involved in the general derangement, varying from a slight headache, and a slight confusion of the mental faculties, which was of short duration, to violent nervous excitement, also sometimes of short duration, and low muttering delirium, speedily merging into coma. The delirium either came on gradually, preceded by frontal headache, giddiness, intolerance of sound, restlessness and sleeplessness, ending in coma and death, or ending in a return to convalescence and recovery; or the delirium came on suddenly, without any premonitory symptoms, when it was generally of a violent kind, and rapidly assumed a low muttering form, and usually terminated fatally. The delirium was sometimes preceded by convulsions; and sometimes it was followed by convulsions and paralysis. Sometimes the convulsions and paralysis, early passing into coma, were unaccompanied by delirium. In some forms of the disease the patient seemed to manifest all the symptoms of acute meningitis, while in others the symptoms resembled those of "delirium tremens." When the delirium came on suddenly and early in the fever, and gradually merged into the low muttering form, and if the pulse was at the same time extremely rapid, the case was regarded as all but hopeless. When, on the other hand, the delirium was of a more violent kind, and much resembled that of "delirium tremens," and was accompanied with a tolerably full and slow pulse, the case was much more amenable to remedies, and usually terminated favourably.

Combined with Diphtheria.—It was not unusual to find, during the progress of the epidemic, cases manifesting symptoms of a diphtheric character, in not a few of which the local manifestations were well marked and characteristic of the disease. I do not allude to the occasional small white patches to be met with in scarlet fever patients, but to the characteristic false membrane sometimes found upon the tonsils and fauces, having a great tendency to spread to the neighbouring parts; and when destroyed by caustics, speedily re-appearing again. When such symptoms appeared, the case not unfrequently terminated fatally even when the fever, with which it was associated, was of a mild type. The diphtheria, for I shall call it by that name, occurred at any stage of the fever. One patient, just convalescent, and able to take moderate exercise, was again prostrated by a very serious attack of the throat affection but ultimately recovered. Another, after recovering from the diphtheria, was seized with a mild form of the fever, accompanied by a copious eruption, while a member of the same family subsequently died from a combination of both affections. When the epidemic fever had almost exhausted itself, and when only a few isolated cases were to be met with, quite an epidemic of sore throat took place. This was especially the case in a neighbouring village where the fever, in its complicated form, had been very fatal. The throat disease exhibited great variety in intensity. In many patients it was extremely mild; in some there was a tendency to ulceration and suppuration; while in others again the disease exhibited the true diphtheric exudation upon the tonsils and fauces. I did not meet with a single case in which the diphtheric sore throat had been communicated from a patient suffering from the scarlatina alone; and no case in which scarlatina had been communicated from a diphtheric patient; but there were several cases in which one or both affections had been communicated from patients suffering from both diseases. From all these observations I was led to the conclusion that there prevailed in this district about the same time an *epidemic*, at all events an *endemic*, of both scarlatina and diphtheria; and that, although frequently associated in the same patient, they were yet different affections, the result of two different poisons; and that an attack of the one furnished no protection against an attack of the other.

Combined with Arthritic Rheumatism.—It was not uncommon to meet with severe attacks of rheumatism associated with the fever. Rheumatism was met with both prior to desquammation, during the time of desquammation, and after desquammation had been completed. It sometimes turned out to be a most troublesome and painful complication. No age was exempt. Adults as well as children were liable to be attacked with it. In one case the arthritic affection was the first to manifest itself; and at the time the eruption was at its height, the joints were much inflamed, swollen, and painful to the touch. Any or all of the joints might be implicated,—the hip and shoulder joints as well as those of the feet and hands. No matter how acute the rheumatism was, or at what stage of the fever it showed itself, it invariably ended in resolution. In several of the cases a bruit was distinctly audible at the heart's base, probably in some measure owing to the anæmic state of the system. I have no doubt however that the heart is liable to become affected in consequence of rheumatic affection in scarlatina; and there is no reason to suppose that heart disease may not even take place, quite independently of the arthritic affection, as the result of the morbid state of the blood consequent upon the peculiar poison. It seems, therefore, of some importance during the treatment of scarlatina, even when uncomplicated, frequently and carefully to examine the state of the heart.

Recurrence of Scarlatina.—A second attack of scarlatina is admitted by all medical practitioners to be of rare occurrence, and it is asserted by some that when it does take place it has never been known to prove fatal. I have frequently had occasion to prescribe for sore throat in the case of nurses and others when attending on scarlet fever patients, but never till the present epidemic, so far as I remember, have I met with a single case of a second attack of the disease accompanied by a well-marked eruption. During the last epidemic, however, I treated several such cases. The first was that of a young woman who, in the month of August of last year (1868), passed through a severe form of scarlatina anginosa. The rash was copious and confluent, and was followed in about ten days by an abundant exfoliation. Her mother, an intelligent person, expressed great surprise at the occurrence of the disease, because her daughter, when a child, had suffered from a severe attack of the same fever, when her skin, in the same manner, came off in scales. Another of the same family, also a young woman, suffered from a similar second attack. There could be no doubt as to the recurrence of the fever in both cases. At the present time I am attending a young gentleman who is suffering from a mild form of the fever. The rash is very bright, confluent, and covers the whole body. His mother states that there is no doubt but that when a child he suffered from the same disease. Several of my medical friends in the district have also, during the epidemic, attended patients labouring under second attacks of the fever, accompanied by the characteristic eruption. Second attacks of well-marked forms of the fever, during the recent epidemic, have therefore not been of unfrequent occurrence.

The following interesting case, an account of which I shall give more in detail, I attended during both attacks, there being only about six months interval between them. D——, a strong healthy boy of six years of age, was one night awakened from sleep with an attack of headache, vomiting, and sore throat. On the following day there appeared over the body a discrete scarlet eruption. In a few days it gradually faded away. For the first three days the fever was pretty high, and the tongue assumed its characteristic red appearance. About the eighth day considerable exfoliation took place, and the patient continued pale and weakly for several weeks. About six months after this, and at the time when the epidemic was most virulent, the same little boy was again suddenly seized with rigors, very severe headache, sore throat, and persistent vomiting, which lasted for about two hours without intermission, followed on the same day by a very copious and confluent rash, but of darker hue than in the former attack. In a few hours it had almost totally disappeared. This sudden disappearance was followed by rapid aggravation of the other symptoms. The eruption soon reappeared in a brighter form, consequent on the child being enveloped, from the neck down, in a blanket wrung out of hot water and mustard; but in a few hours it had again become much darker in appearance, and on the third day it had coalesced into spots very much resembling those found in the worst forms of typhus fever; and before death these became developed into dark purple patches. From the moment of attack the fever was exceedingly high, and the throat was much congested and of a dark red. The tongue early became hard and parched; delirium gradually set in, and the patient died comatose, on the fifth day.

Another case which was of peculiar interest was that of a middle-aged woman, six months gone in pregnancy. I was called to see her step-daughter, who was living with her. I found the step-daughter very weak and pale; her skin was rough, dry, and there was an abundant desquammation taking place. On inquiry I ascertained that the girl, three weeks previously, had been unwell and suffered from sore throat; so that there was no doubt but that she was recovering from a mild form of the fever. The mother was duly warned of her danger if she took the disease, and ordered to use every precaution; she replied that she was not afraid, as she had had the fever when a child. In a few days after this I was sent for to see the mother. I found on my arrival that she had on the previous morning given birth to a dead fœtus. Her tongue was brown, very parched and hard; her throat was much congested, and was of a deep brown colour; her pulse was 160, and very feeble; and there was to be seen over the body and apparently under the skin, a great number of very minute purple spots. She died in a few hours after my visit. From the time the abortion took place she sank rapidly, not from post partum hæmorrhage, but as if from the depressing influence of some virulent poison. I may mention that this woman had, about a year previous to this, aborted at three months. In all probability the care and anxiety to which she was subjected on account of her daughter had induced premature labour, and thus predisposed and prepared the system, as it were, for receiving and developing the scarlatinal poison in its worst and fatal form. If, therefore, I am correct in my diagnosis of these cases, the fever may not only occur twice in the same individual, but contrary to the expressed opinion of eminent practitioners, a second attack, in spite of our most approved medical appliances, may even prove fatal.

Propagation of the Fever.—The disease did not fall upon the whole district at once. It appeared at first only in isolated cases, one occurring here, and one there, at long intervals, and at considerable distances from each other; but many of the cases formed the centre of a number of others. It was some months after its first appearance before it assumed its epidemic character, and even then it seemed to leap from one part of the town and country to another, leaving intermediate streets and villages wholly free. While absent in one locality, it was very prevalent and fatal in another. In many cases the disease appeared to take its origin in epidemic influence; but in by far the greater number there was clear evidence of its being propagated by the poison conveyed from infected localities. All within the range of any epidemic are liable to take into their system more or less of the *materies morbi*, which, according to its amount or the state of the system at the time of the infection, will remain inert, or produce the specific disease of greater or less virulence. There are, however, certain causes constantly at work which predispose to an attack of the disease; and which, when the affection becomes epidemic, have a most injurious effect, diffusing the disease all around. It may be broadly asserted that, whatever tends to generate in the system, or to introduce into the system, any decomposing organic compound, or to interfere with the functions of the different organs so as to prevent the elimination of such deleterious substances, cannot fail to deteriorate the blood, to weaken the vital powers and energies; and thus, by giving every facility for the development of the disease, to render the individual in a great measure liable to the influence of the specific poison. Amongst such dangerous influences may be enumerated, impure air arising from overcrowding and imperfect ventilation, impure water, unwholesome diet, the effluvia proceeding from the lungs and skin, and which, if introduced into the system and retained there, will act most injuriously on the whole economy. These are some of the most fruitful causes of fever, and in their combination constitute the most favourable condition for the development of epidemic poison. Those children who are exposed to these influences cannot fail to have their whole system weakened, and their vital energies impaired to such an extent as to render them unable successfully to resist the action of the poison, and consequently they fall victims to the disease. The purer the blood and the more healthy the various functions of the body, the less liable is the system to be influenced by the *materies morbi*. It is possible, therefore, by keeping the blood in a state of purity, by preventing the introduction into it of organic and other injurious impurities; or when introduced by promoting their early removal, to mitigate and effectually impede the progress of epidemic fever. The disease, however, was propagated in most cases by contagion, the poison itself being received directly from the individual affected, or communicated in some way by a third party. The period at which this contagion is most likely to take place is when the body is freeing itself of the poisonous matter; this is generally admitted to be during the process of exfoliation. The poison is thrown off chiefly by the lungs and skin. The breath of a fever patient is not only charged with the organic products of the system, but also with the fever poison itself, and when, on quitting the body, it mixes with the colder external air, it separates into its component parts, which are either deposited on the clothes and other articles around, or float in the atmosphere of the apartment. At the same time the cuticle, during desquammation, is constantly rising from the body in the form of minute powdery scales, and is deposited in like manner all around, so that those who are exposed to that atmosphere cannot fail to breathe large quantities of the fever poison. When clothes and other articles, saturated, so to speak, with the specific poison, from being long exposed in such a sick chamber, are carried to other localities, and brought into contact with other children, they cannot fail to impart the fever to those of them who have not had the fever already, or who are otherwise predisposed to take it, and may thus be a means of spreading the epidemic. I attended a patient in a remote part of the country, to whom the disease was evidently communicated by the poison being transmitted in a small parcel from a relative at a considerable distance, who was just recovering from a severe attack of one of the worst forms of the fever. Blankets and other articles of clothing sent to be washed and otherwise purified, without having those to whom they are sent informed of the fact that the articles have been used by fever patients; and furniture similarly exposed to the poison, sold, bought, and carried to other places, without being first disinfected, all may assist in spreading the disease and prolonging the epidemic. Again, it is not an uncommon practice amongst the poor classes, especially during the warmer weather, to allow their children to run about on the streets, and even to attend school, and thus mingle with other children, *before they have completely recovered from the* fever, and even *before desquammation* has been *completed.* In this way the disease may be, and I have no doubt is, frequently communicated from one to another. Were these and similar facts constantly borne in mind, and carefully acted upon by parents, and guardians, and nurses, I doubt not that scarlet fever would in a great measure be repressed, if not totally extinguished.

(To be continued.)

III.—REMARKABLE CASE OF CARDIAC POLYPI, EMBOLISM OF COMMON ILIAC, AND GANGRENE OF FOOT.

By JAMES STEVEN, M.D., *Physician and Lecturer on Clinical Medicine to Glasgow Royal Infirmary.*

(Read to the Medico-Chirurgical Society, 7th Jan., 1870.*)*

W. M., aet. 17½ years, rope-spinner, was, on 21st Sept. 1869, admitted into Ward 5 of the Glasgow Royal Infirmary, complaining of loss of power and intense pain of his right lower extremity. He had been at work and in his usual health up till the previous evening, having not the faintest idea of anything being the matter with him, till about 11 P.M., just outside the door of his home, he was suddenly seized with such a severe pain in the calf of the affected leg as made him cry out, and caused him to fall to the ground. He was immediately carried into the house and put to bed; but he spent the night in the greatest agony, and was brought to the Infirmary the following day unable, apparently, to move without help. When put to bed in the ward, he at first complained of pain in both lower limbs from the hips downwards, and he kept up a ceaseless moaning, interrupted only when exacerbations of the pain caused him to shriek out. On examination, the right limb was found somewhat swollen, especially about the popliteal space and the calf. It was extremely sensitive to the lightest touch, and firm pressure, more particularly in the course of the arteries, caused unbearable pain of a burning character. Movement, likewise, greatly aggravated the pain, which, on the whole, seemed most endurable when both the hip and knee joints were flexed. The colour of the parts was unchanged, but the whole limb was perceptibly colder than its fellow. It was thought feeble pulsation could be felt in the femoral artery, though nowhere lower; but on the following morning renewed examination failed to detect it.

The patient's general appearance, while he was at rest, did not suggest the existence of chronic disease. He was moderately well developed, and had the appearance of considerable vigour. Beyond the affection of the limb, he was not aware of there being anything wrong with him, although when questioned he admitted he had, so long back as he could remember, been troubled with beating of the heart upon unusal exertion. This palpitation, he had been led to believe, was originally induced by a fright received when he was quite a child. He never had rheumatism, and was never off work with illness till now. His tongue was clean, his bowels regular, his respirations were 26, and his pulse 80 per minute; the latter being full and bounding, with a well-marked thrill. His chest was found to be well-formed, and the respiratory sounds unexceptionally good. The cardiac dulness, however, was much increased, and the impulse widely diffused, strong, and heaving, and attended with a peculiarly well-marked thrill, not confined to the apex merely, but felt over the whole area of dulness. The sounds were loud and harsh, and attended with a prolonged rough, grinding, systolic murmur. This murmur was loud over the whole centre and left side of chest in front, and was also well heard behind; but it appeared to be loudest over the base of the heart, and to be propagated into the vessels of the neck, in which the thrill was synchronous with it.

Embolism of the external iliac artery was diagnosed, and the importance of perfect rest, with warmth of the limb, was enforced. But the pain was apparently so aggravated at times, that although sedatives were freely administered, he became impatient of all restraint, and tossed about, even in his restlessness getting repeatedly out of bed, and undoing the flannel bandages in which the limb was enveloped. The following day, therefore, I was not astonished to find some lividity of the foot and ankle. The patient complained less of the pain; his pulse was 86, his respirations 32, and his skin was covered with perspiration; the foot was cold. The opiates were continued, and on the 24th he had four ounces of wine, increased on the 26th to six ounces daily. He continued to take a little food, and with the wine and the opiates, which were repeated *pro re nata*, he submitted very patiently to the pain which he still felt in the leg.

Further than a rise in the pulse to 100, or thereabouts, the respirations remaining about 30, no material change took place in the symptoms. The foot and ankle exhibited the gradual changes in hue usually observed in senile gangrene. On the 8th of Oct., a line of demarcation began to be traced four inches above the internal malleolus, but very little above the os calcis behind and towards the outer aspect of the foot. The great toe, much earlier than the others, became shrunken and black. Above the line of demarcation, for some time before it became well defined, the temperature of the skin was raised, and much pain was suffered in the neighbourhood. The pain was considerably relieved by the application to the parts affected of equal parts of lin. belladon. and lin. opii. But notwithstanding increased stimulation, and such nutritious diet as he could make use of, by the end of three weeks his strength had failed much, and the foot and ankle had become quite black, with the line of separation well formed. He was, on the 19th of October, transferred to a surgical ward, where he was under the care of Dr M'Leod, who wisely refrained from surgical interference till November 21st, when the mortified foot was simply disarticulated and removed. He died on the 24th Nov.

For some days previous, he suffered from aggravated attacks of dyspnœa and cardiac distress, which nothing seemed materially to relieve. While in Ward 5, he had suffered but little from this, and indeed made almost no complaint of his chest, although the heart was frequently examined, and he was aware, from the remarks occasionally made in his presence, that there was the seat of the primary disease.

The inspection was made on the 26th, by Dr Joseph Coats, Pathologist to the Infirmary.

The state of the vascular system was chiefly had in view in the examination which was made. The brain was not examined. The liver was somewhat enlarged and fatty. The spleen presented a small puckered white patch on its margin. The kidneys showed no morbid appearance. Both lungs were loaded with dark blood in their dependent parts, and did not crepitate freely on pressure. The pericardium occupied a very large portion of the centre and left side of the chest, and, on laying it open, it was found to contain about an ounce of reddish serum, but no evidences of inflammation were discovered. On opening the left ventricle of the heart, which was done by an incision in the anterior wall, parallel to and about an inch from the septum, the knife was found to have cut into, without completely severing, a large firm fibrinous mass, which, with soft dark coloured coagula, seemed to distend the cavity. On clearing out these last, and examining the firm mass referred to, it was found to be made up of twelve or thirteen polypoid coagula having a common attachment to the inner surface of the anterior wall of the ventricle, at about its middle height. From this common base, which was an inch and a quarter in length, and half an inch in breadth, the several coagula hung towards the apex of the ventricle, showing considerable variety in their lengths, the longest reaching quite into the apex of the cavity. The main polypus, as it might be called from its appearance in the recent state, was attached to the wall of the ventricle, over a space about an inch in length, from which it was suspended. The greater portion of it had a semi-transparent red colour, but at its base it appeared to be composed of white fibrous tissue, and the effect of the white structure becoming lost in the coloured portion was such as to produce a strong resemblance to a muscle at the junction with its tendon. The first incision having, as already stated, nearly severed the fibrinous mass at its attachment to the wall of the ventricle, made it sufficiently plain that there was no softening of its centre. But there was thus exposed within the polypus an elongated deposit of a rough, gritty substance. This measured about an inch in length, and had a diameter of about 1½ lines. Another deposit of the same substance was found on the free surface of the polypus which hung immediately internal to the largest, but so far as examined there was no similar deposit in or on any of the others; nor did there appear to be deposits of any kind upon the valves of the heart. The greater number of these polypi presented the same semi-transparent red colour as the bulk of the largest mass, but one or two were throughout of a pale amber hue. They were all remarkably firm in their consistence, and although after maceration in spirit small portions were readily broken off, all the handling they were subjected to in the recent state and after being hardened by spirit, has not detached any portion of them from the endocardial surface. These pendulous bodies together formed a mass which was estimated in its recent state to weigh about two ounces avoirdupois. In addition, there was a single glistening white tendon-like band, of the diameter of a small quill, which, starting from the upper border of the extreme left of the surface of attachment of the mass described, passed obliquely upwards and across the ventricle to attach itself to the septum. The dark-coloured soft coagula usually found in the heart were abundant, as already noted, but they were easily removed, appearing to have no connection whatever with the substances described more than they (the dark clots) had with the walls of the ventricle. The ventricle was enormously distended and thickened. The columnæ carneæ were much hypertrophied. The mitral valve seemed normal, and the aortic valves only slightly thickened. The heart, together with the roots of the large vessels, after removal of the loose coagula, weighed two pounds six ounces; and the left side might be said to furnish almost the whole of this enormous bulk, for the septum bulged towards the right ventricle so greatly that the free wall of that ventricle (which was not thickened like that of the left) looked like a mere layer of muscle closely adapted to the convex surface of the septum: hence the right ventricle was little, if any, increased in its capacity. It was empty. Nothing abnormal was observed in the auricles. The arch of the aorta was somewhat dilated, and the effect of the great enlargement of the heart was to make all the great vessels seem abnormally small.

On dissection, the obstruction to the circulation of the lower extremity was found to be produced by a firm adherent clot occupying the abdominal aorta at its bifurcation. This completely blocked up the right common iliac artery, but only partially the left. Below the obstruction the right iliac was considerably contracted, but it is cause for regret that time was not permitted to make such a complete dissection as would give an answer to the interesting question,—how came it that the gangrene was so limited—how had the circulation been carried on?

IV.—THE FORCES WHICH CARRY ON THE CIRCULATION OF THE BLOOD.

By Andrew Buchanan, M.D., *Professor of Physiology in the University of Glasgow.*

PART II.—THE VASCULAR FORCES.

As the remaining part of our subject was only taken up with reference to the force of the heart, it might have been passed over with the slight notice already given, were it not that it is a subject of great interest in itself,—and still more, that we cannot fully apprehend the part which the heart plays in the circulation of the blood without knowing whether and to what extent it derives assistance from other forces.

The mass of blood to be moved is about an eighth part of the weight of the human body, or 17½ lbs. in a man of 10 stones in weight; and the following table gives a synoptical view of the velocity of the current of blood in the various parts of the sanguiferous circuit:—

VELOCITY OF BLOOD.

	Inches per minute.
Root of aorta, - - - - -	600
Mean arterial current, - - - -	39·84
Onward motion in network of capillaries,	2.64
Mean venous current, - - - -	24·36
End of venæ cavæ, - - - -	205

There are three forces mainly concerned in carrying on the circulation of the blood. These are:—1st. A central propulsive force. 2nd. The muscular contractility of the blood vessels; and 3rd, A central pneumatic force, or the atmospheric pressure toward the chest and heart, rendered effective by a central dilative force. Of these, the second is in the human system comparatively insignificant, while the first and last divide between them the labour of carrying on the circulation of the blood in proportions not differing much, as we shall hereafter endeavour to show, from 3 to 2.

The central propulsive power consists in a triple series of muscular contractions,—those of the great venous trunks, of the auricles, and of the ventricles, which take place rhythmically in the order of succession just indicated. The two first of those forces are expended in maintaining the circulation through the heart itself. We have therefore only to consider the propulsive force of the ventricles, and chiefly that of the left ventricle, which is more powerful than the right, as might be expected from its structure, and from the greater distance and more numerous and denser tissues to which it has to propel the blood. Our most certain information, with respect to the relative force of the right ventricle, is derived from an observation of Hering, which he had the opportunity of making on the heart of a calf affected with congenital ectopia of that organ. He found the height of the hæmastatic column in the right ventricle to be to that of the column in the left as 1 to 1·7; so that the propulsive power of the left ventricle must be to that of the right as 10 to 7·64 nearly. We know also that the area of the pulmonary artery is greater than that of the aorta, so that the blood must move more slowly through it in the same proportion. To the force of the left ventricle, the mode in which it is expended, and the velocity with which the blood issues from it, we need not return.

We cannot, however, but advert to this same force as it appears under an altered form after the blood has been injected into the arteries, and comes under the influence of the elastic coat of these vessels. The elasticity of the arteries never can be regarded as a primary moving power of the blood, as it imparts no new force, but merely reflects the force imparted by the heart. In this way it serves two most important purposes. In the first place, it equalizes and renders continuous the intermittent force of the heart, substituting for it an uniformly acting force, which controls the irregular movement of the blood, and propels it in an uniform stream through the smaller arteries, the capillaries, and the veins,—moderating, at the same time, the shock which it communicates to the tissues, as it permeates them. Hales* has very aptly compared the elasticity of the arteries to the elasticity of the air in a forcing pump, which, acting with an uniform pressure on the surface of the liquid, impels it in a steady and equable stream, however irregular the force may have been by which it was introduced into the reservoir. At page 190 will be seen the description of an apparatus in which gravity is substituted for the elasticity of the arteries, and plays exactly the same part, returning in an equable form the whole force delegated to it by the intermittent contractions of the pump.

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* Hæmastaticks, Vol. II., p. 23.

The other purpose served by the elasticity of the arteries is not less important,—indeed, without it the circulation of the blood in the remote peripheral circuits could not be carried on. It propagates the force derived from the heart unabated throughout the whole arterial system, so that arteries of equal size, whether near to or remote from the heart, propel the blood with the same force into the capillary vessels in which they terminate. Poisseuille has shown that in all arteries the hæmastatic column stands at the same height, there being an equilibrium of tension throughout the whole arterial system. The whole arterial blood may therefore be regarded as contained in a single reservoir, surrounded everywhere by the same elastic membrane, and everywhere pressed upon with equal force. In this way the force of the heart, instead of ceasing at the extremities of the arterial system, as some physiologists have supposed, is, as it were, delegated to the terminal arteries, enabling them to press the blood with equal force into their corresponding veins. This provision is rendered necessary by the great inequality in the length of the circuits by which the blood supplied to different parts returns to the heart. Without it the blood would return in a full stream through the most direct channels, and would stagnate in those more remote,—just as we see in a river where it spreads wide, the main current is in the middle, while at the sides it revolves in eddies or completely stands still. It will, however, be seen hereafter that the pneumatic forces exercise an important influence over the circulation through the capillaries.

The second moving power, above-mentioned, is the muscular contractility of the blood-vessels. Whether the arteries, in addition to the physical contractility which enables them to reflect and modify the force of the heart, possess also a vital contractility capable of communicating an original and independent impulse to the blood, was much discussed among the physiologists of the last age. The numerous arguments adduced on the affirmative side had already, in general estimation, decided this question, when the discovery of muscular fibres in the coats of the blood-vessels, and more especially in the smaller arteries, finally removed all doubt with respect to it. Still further, recent investigations have shown the muscular fibres of the blood-vessels to be like other muscles, under the control of the nervous system. Muscular fibres are found in the coats both of the arteries and of the veins, but most abundant in the former. They are likewise much more abundant in the small arteries than in those of larger size. The capillary vessels alone are devoid of them. Hence, these last vessels are regarded as mere passive channels of transmission, except in so far as they are modified by the relaxation or contraction of the tissues in which they are distributed, while all the rest are believed to possess more or less of a vital contractility, capable of imparting a fresh impulse to the blood as it passes through them. The action of the muscular fibres of the blood-vessels, like that of other unstriped muscles, is of the tonic kind, persisting for a certain period after being once excited. The effect of it is in the first instance to empty out the blood-vessels of a certain quantity of the blood which they contain, and thereafter to make them receive a less quantity of blood so long as the contraction continues. The muscular fibres of the arteries act by increasing or diminishing the tension of the elastic coat, but the effect on the movement of the blood is the same, for it is so distributed in the neighbouring arteries as to maintain everywhere among them an equilibrium of tension,—just in the same way, if two separate air-chambers acted on the same mass of liquid, a force acting by expanding or condensing the air in one air-chamber would immediately occasion a fresh distribution of the liquid, till equilibrium was restored.

But a further question remains for discussion. To what use does nature intend the muscular power of the blood-vessels to be applied? Is it as a constantly acting force to assist in the progressive movement of the blood; or does it merely serve a secondary purpose, meeting the contingencies that present themselves in particular parts, and so regulating the local distribution of the blood? We may, I think, safely reply to this question, that while nature often does apply the muscular power of vascular tubes to answer the former purpose, yet in the sanguiferous vessels of man and the higher animals it is applied solely, or almost solely, for the latter purpose.

In the lower animals, destitute of a heart, (if we except the very lowest), the muscular power of the blood-vessels supplies its place, and in the lymphatic vessels of man the lymph is propelled into the venous system by the same power. But whenever this occurs, we at once recognise it by two conditions, the presence of one or other, or of both of which is indispensable to the effectual working of the contracting tubes. Either the tubes must be everywhere plentifully furnished with valves, or there must be a regular rhythm in their contractile action, corresponding to the direction in which the fluid is to be propelled. It must be obvious that without those conditions the contraction of any vessel would force the liquid within it as much backward as forward, and most readily in whatever direction the resistance was least.

The presence of valves in any part of the circulating system certainly indicates the action at that part of a force capable of producing retrogressive movement. But vascular contraction is not the only such force, for the same effect results from compression of the vessels, whether by external force or by the action of circumjacent muscles. But these cases are easily distinguished by the much less extensive distribution of the valves in the latter cases than in the former. Whenever a liquid is impelled through a set of tubes by vascular contraction aided by valves, those valves will be found thickly set in the whole or great majority of those tubes. Such is the structure of the lymphatic vessels, and, in consequence, we infer that the lymph is propelled mainly in these vessels by the contraction of their muscular fibres,—which, among reptiles, are assisted by the organs named lymphatic hearts. In the blood-vessels, on the contrary, we find valves almost only in the superficial veins which are exposed to external pressure or the compression of contracting muscles, while the absence of valves in the deep-seated veins, in the capillaries, and in the arteries, disproves in so far the action of the muscular fibres of the vessels as a cause of the progressive movement of the blood; and the disproval becomes complete when we find that there is no rhythmic movement of the fluids in the veins, capillaries, and smaller arteries. The only rhythmic movement observed in the vascular system is that originating in the heart. It is counteracted by the elasticity of the arteries, and does not usually extend to the end of the arterial system, unless the vessels be distended with blood, when it stretches into the capillaries, as may be at any time seen under the microscope in the web of the frog's foot, by obstructing the flow of blood through the veins of the limb.

The conclusion here drawn, that the use of the muscular fibres of the blood-vessels is to regulate the local distribution of the blood, is quite in accordance with the recent experiments on the nervous system, which have been interpreted as producing palsy of the vaso-motor nerves of particular parts; for the effect is not to obstruct the circulation in these parts, but to cause a permanent afflux of blood towards them, which they are no longer able to get rid of.

The doctrine of Bichât, that the force of the heart extends no farther than the end of the arteries, and that the blood receives a new impulse from the capillary vessels to carry it onward to the heart, is disproved by the structure of those vessels, which shows them to be incompetent for such an action. It is disproved also by the experiments of Magendie, showing that the interruption or retardation of the blood in the crural artery is indicated instantaneously by a corresponding interruption or retardation of the blood in the crural vein, and proving manifestly that there is no intermediate force which has the slightest influence over the stream.

Many physiologists, following the late Dr Allison of Edinburgh, adopt the theory that the blood is urged onward through the extreme vessels, in which the arterial and venous systems communicate, by a force originating in the physical and chemical actions going on in the tissues of the lungs on the one hand, and of the general system on the other. Some of them suppose "the oxygen in the pulmonary cells" to have an attraction for blood in the venous state, but none for blood in the arterial state, whence the venous blood is drawn along the pulmonary capillaries, and drives the arterial blood before it; but this attraction being reversed in the systemic capillaries, it is the arterial blood which is drawn along them, and now in its turn drives the venous blood before it. To this doctrine the great objection is that it is a pure figment of the imagination, as there are no forces, physical or physiological, known to exist in nature, which could possibly produce the effects here referred to. But many of them do not go so far, and are entitled to a candid hearing so long as they keep within the recognised limits of mechanical science, and propose merely to transfer to the animal economy principles which are held to afford an explanation of the circulation of plants.

There is a great contrast between the circulation of plants and that of animals. In the latter the blood moves with great rapidity within distinct vessels, and always in the same direction from the heart to the heart again. In the former the sap moves very slowly, in vessels or other channels by no means well-defined; sometimes in one direction, sometimes in the opposite, but never in a course to which the name of circulation can be strictly applied, for it is a mere progression from one part of the plant to another. The rapidity of the current in animals is indispensable for the supply of the nervous and muscular tissues; while in plants, where these tissues do not exist, the movement of the sap serves merely for the elaboration of the nutrient fluid, and the conversion of it into tissues and other products of nutrition.

Passing over the less perfect vegetable forms, it is enough for our purpose to speak of the movement of the sap in the trees of our own country, in which it has been most successfully investigated. In these it exhibits, annually, three remarkable phases,—differing from each other in the season of their occurrence, in the physiological objects which they serve, and in the mechanism by which they are effected.

The first occurs in the spring, and serves for the development of the buds, the elongation of the stem and branches, and the evolution of the leaves. It is effected almost entirely by the force of osmosis. All that capillarity has to do with it is to take the first step by introducing water into the tissues of the root, expanded by the first heat of the season. But no sooner is the liquid introduced than it acts through the intervening membrane on the inspissated juice, deposited for that very purpose at the end of the preceding year in the cells of the plant; an active osmosis ensues, the liquid rising in the sap vessels and other pervious channels exactly as it does in the tube of an osmometer. Such is the force with which it is pressed upward that in the vine it has been found, in the spring, to counterbalance a column of mercury 38 inches in height, equal to 43 feet 3½ inches of water*—a performance quite equal to that of a good osmometer. If, again, a branch of any size be wounded, as by cutting it across, a copious discharge of sap ensues, sometimes so great as even to endanger the life of the plant, and hence the period, when this movement is going on, has been named the bleeding season. This movement does not cease entirely on the exhaustion of the inspissated sap contained in the stem, for it may continue during the whole season, the leaves first developed supplying the inspissated juice by which the further growth is kept up. This is what happens in annual plants, in which, when they begin to grow, the supply reposited in the cotyledons of the seed acts the same part as the annual deposit in the stems of trees, and thereafter the leaves, as they are successively developed, act the same part as fresh cotyledons.

The second phase of the sap-movement is subservient to the functions of the leaf, and is at its height when the leaves are fully expanded during the summer months. The crude sap absorbed by the root is carried to the leaves to be converted into the true sap (succus proprius) of the plant. The liquid rises through the sap-vessels as far as the leaves by capillary attraction, assisted probably to a small extent by the force of osmosis; but that the latter force is comparatively insignificant, is manifest from the fact that bleeding now no longer takes place on the plant being wounded, for any fluid within the sap-vessels is retained there by capillary attraction instead of being protruded, as would have happened from osmosis. But these forces could produce no continuous ascending movement of the sap were the sap-vessels not continually emptied out at their upper ends by the exhalation from the surface of the leaves, occasioned by the temperature and dryness of the ambient air. The apparatus described by Liebig, consisting of a glass tube filled with water, having its upper orifice covered by a bit of bladder, while the lower is immersed in a vessel of water, illustrates the moving force in this form of the circulation of plants, as an ascending current is maintained in the glass tube by the continual evaporation from the surface of the bladder. We have another familiar illustration in Bergson's spray-maker, in which the liquid to be converted into spray and vapour is continually carried off from the orifice of an upright capillary tube, and so causes a rapid ascent of the liquid in the tube by which it is supplied.

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* Hales, Vol. I., p. 124.

The third phase in the movement of the sap is the converse of the first. It occurs in the autumn, when the leaves have completed the elaboration of the proper sap. They now no longer exhale moisture but absorb it,—a change in their action which is in harmony with the increased moisture and diminished temperature of the external air. But the water is no sooner absorbed than it re-acts physically upon the inspissated juice reposited in the leaves, and an active osmosis ensues. The current sets chiefly downward, assisted by gravity, and goes to form the new layers of wood and bark, in which the superfluous portion of it is reposited in preparation for the osmosis upward in the ensuing spring. A portion of the sap, however, goes upward to form the seeds, and the whole of it may do so, as in annual plants. An interesting result as well as an evidence of the descending current being caused by osmosis, is that the phenomenon of bleeding from wounds again presents itself, but with this difference, that the flow is from above and not from below, as in the spring. This is well seen in the process for collecting the resinous juice of the pine by cutting the trunk of the tree near the ground about half-way across and obliquely downward, while a chamber is excavated in the part of the trunk beneath to receive the descending juice.

But to return to our argument. Of the three phases of the circulation in plants described above, the first and the last, which are the results of osmosis, are not attended by any sensible movement of the sap unless there be some accidental outlet for it, as by a wound, which bleeds upward in the spring and downward in the autumn. But in normal circumstances, when once the vessels have been filled, there is merely an insensible movement of the sap, which is urged by a powerful expansive force into the soft substance of the growing tissues. Such a movement cannot be compared with the continuous movement of the blood in animals. The second or summer phase again presents a continuous flow of the sap from the roots to the leaves, and can be readily compared with the circulation in animals. Now, the quantity of sap which flows upwards depends entirely upon the quantity of vapour which is exhaled from the leaves, and by measuring this exhalation, vegetable physiologists have been enabled to determine the quantity ot sap which flows along the stem in a given time. Thus, in a sun-flower 3½ feet in height, and having a transverse area of a square inch in the middle of the stem, Hales found 20 ounces ot sap to pass upward through the stem in twelve hours during the day.* Now, the lungs are to animals what the leaves are to plants. We know also the amount of exhalation (comprehending under that name both the watery vapour and carbonic acid gas) which takes place from the pulmonary mucous membrane in man to be about 40 ozs., or 2½ lbs., in the twenty-four hours, or just about double that which takes place in the sun-flower, for plants during the night exhale very little moisture, and often absorb it. But what can be inferred from this comparison? Simply that two and a half pounds of liquid pass along the pulmonary artery in 24 hours. Now, the quantity of blood which actually passes along the pulmonary artery is 17½ lbs. in two minutes. Even, therefore, if the exhalation from the lungs were as influential over the circulation of the blood as the exhalation from the leaves unquestionably is over the movement of the sap, the small quantity of the pulmonary exhalation, when compared with the vast torrent of the circulating blood, renders it utterly insignificant, considered as a moving power.

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* Vegetable Staticks, p. 7.

PART III.—THE PNEUMATIC FORCES.

SECTION 1ST.

GENERAL PRINCIPLES.

The third moving power of the sanguiferous system, and almost the only one worthy of being taken into account along with the propulsive force of the heart, is the pressure of the atmosphere towards the thorax and heart, in each of which there exists an active dilative force which the pressure of the atmosphere counteracts, and thus propels the blood onward to restore the equilibrium.

Incredulity of British physiologists as to pneumatic forces.—On no subject within the bounds of physiology or of medicine does such a diversity and inconsistency of opinion prevail among medical men as with respect to the above-mentioned force. If you ask them if they believe in the existence of such a force, they will probably reply, with Dr Arnott, that it is "physically impossible," and perhaps add with a sneer, that such a belief could only enter into the minds of men ignorant of the first principles of mechanics. If you ask them again if they believe in the danger of laying open veins, in performing operations in the vicinity of the heart, they will reply, without hesitation, that well-authenticated cases are on record in which atmospheric air has entered veins laid open by such operations, and passing on to the heart has caused death, just as happens from the forcible insufflation of air into the veins. Still further, it will surprise some of the veterans of the profession who, in their younger days, when venesection was still held as a remedy in the healing art, were in the habit daily of performing that operation—it will surprise them, as it did me, to be informed that the ribbon, which they in their simplicity conceived to be bound round the arm merely to intercept the refluent blood, is of use for the still higher purpose of preventing the atmospheric air from entering the vein, and so being transmitted to the heart.* Such an occurrence from the wound of a superficial vein of the arm I believe to be impossible, from the multitude of collateral channels through which the blood has free access to the heart. But even if the reasoning be erroneous, it still shows, on the part of our surgeons, a firm belief in a physiological doctrine which is formally repudiated or timidly ignored by the leading physiologists of this country.

Causes of this incredulity. The hostility of Dr Arnott.—This unsettled state of medical opinion, as it exists only among ourselves, must have originated in local causes. It appears to me to be satisfactorily explained by the influence on the one hand of the ingenious arguments and experiments of Dr Carson and Sir David Barry, and on the other of the sweeping denunciation of their opinions contained in Dr Arnott's work on Natural Philosophy,† a work which has exercised a powerful influence on the minds of medical men on most subjects where physiology rests on the basis of physics. On the present occasion that influence has been very great and permanent. Whether it was merely that Dr Arnott regarded the new doctrine as an unwarranted innovation on the venerable teachings of Harvey, whose disciple he professes himself to be, or whether he had other causes of antipathy against it or its abettors I cannot say, but certainly he has spared no pains in his endeavours to exterminate it. He does not merely seek to persuade his readers by the force of his arguments, but to carry them away by the authority of his name, or terrify them into submission by the violence of his criticism. Even Dr Arnott's warmest admirers (of whom I have always been one) cannot but regret the spirit in which he has carried on this controversy, the supercilious dogmatism with which he enunciates his own opinions, and the immeasurable contempt, or rather pity, which he ostentatiously bestows on his two antagonists, and on the whole medical profession, as participating in their ignorance and credulity.*

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* I have known several abettors of this opinion, although I am not aware whether it has been made public through the press.

† 2nd Edition. 1825.

His general objection to all forms of pneumatic agency.—Dr Arnott's great name, and the general acquiescence in his opinions, which it has procured for him from the medical public in this country, render it necessary for me to consider his objections fully. Some of them will be best discussed along with those parts of our argument to which they respectively correspond; but there is one which seems to me entitled to a preliminary discussion, as it is an objection of a general kind, not applying to one part only, but to the whole of our subject; and, if valid, rendering all further discussion unnecessary, as it is subversive of the doctrine of pneumatic agency, under whatever form it can assume.

Fallacy of Dr Arnott's reasoning.—The objection is that the veins are pliant tubes, which collapse on the slightest pressure applied to them. This, according to Dr Arnott, "proves it to be a physical impossibility that a sucking action of the heart or chest can be a cause of the blood's motion along the veins." No pump, he says truly, can lift liquid through such pliant tubes. If any one were to attach a syringe to a piece of gut or eel skin, or vein, and be so foolish as to try to draw up water through them, the attempt would be frustrated by the immediate collapse of the tubes. Dr Arnott's premises are undeniable, but his conclusion is not the less illogical. He argues from one set of physical conditions to another, which is totally dissimilar. In the case supposed above, there is only one force in action, the pressure of the atmosphere, which causes the tube to collapse; as there is no other force to oppose it and keep the tube distended. In the veins of a living man, again, there are two forces in action, which Dr Arnott has overlooked; the force of the heart and the pressure of the atmosphere. These two forces are so wisely adapted to each other that, while both of them propel the blood along the veins, each of them prevents the inconveniences and danger that would have resulted singly from the action of the other. If the atmospheric pressure were to act alone, the circulation would be at once arrested by the collapse of the veins. If, again, the force of the heart were the sole moving power, the veins would be continually in a state of dangerous over-distension and obstruction. The combination of the two forces completely obviates these dangers and inconveniences, for the veins in the state of health are kept always moderately full without the risk of over-distension on the one hand, or of collapse on the other.

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* In the last edition of his work, Dr Arnott, while he adheres to his conclusions, omits the whole argument from which they are derived. His readers would have been better pleased if he had repeated the argument, merely omitting the offensive passages which disfigure it in the former edition.

It is admitted, on all sides, that the blood vessels are in an eminent degree susceptible of the influence of atmospheric pressure, as they are, for the most part, exposed to it at every point, either directly, like the superficial veins, or indirectly through the soft parts in which they are imbedded. The vessels which pass through bony channels, or lie within the cranium, are less exposed; but are still acted upon through their free extremities, like the rigid tubes in any ordinary hydraulic apparatus. These remarks, it is to be observed, apply not to the veins only, but to the whole blood vessels of the body, arteries, capillaries, and veins. It is a great error, leading, as will be seen below, to the misinterpretation of many important physiological phenomena, to conceive the effects of the pressure of the atmosphere to be confined to the veins in the vicinity of the chest.

It is farther admitted, on both sides of this discussion, that, if a pump be attached to a flaccescent tube full of liquid, and that liquid be not simultaneously influenced by any propulsive force, the effect of the action of the pump will be only transitory; for, as soon as the tube is emptied of liquid it will collapse, and render all further action of the pump a physical impossibility. But, if any propulsive force be in simultaneous operation, then, it is here contended —1st, that the continuous action of the pump is quite possible, so long as it is not too powerful, that is, so long as it is kept within the limits of the physical conditions indicated generally above, and particularly defined farther down; and, 2nd, that the continuous action of the pump so employed is signally effective in promoting the flow of liquid through the tube, whatever may be its length, however great may be its thickness, and whatever, within certain limits, may be its tenuity, or to whatever extent it may be divided into branches, and these again united into a single tube, the whole constituting two arborescent systems of tubes, like the blood vessels of an animal body. The time taken up with this discussion is not, therefore lost, since it enables us to determine the general laws according to which pneumatic forces operate within the living body: or, in other words, under what physical conditions, and with what mutual limitations, a propulsive and a pneumatic force can be of use in promoting the flow of liquid through membranous tubes.

Physical conditions under which pneumatic forces act on flaccescent tubes.

(1.) *As auxiliaries to a propulsive force.*—The first general law is that already stated, that every pneumatic force must necessarily be accompanied by a constantly acting propulsive force. Hence it is clear, that a pneumatic force never can be more than an auxiliary force, and never can be the prime and sole moving power; for there must necessarily be a propulsive force acting from behind; or, what is usually termed a *vis a tergo*, to keep the flaccescent tubes from collapsing, as they must necessarily do if the propulsive force were to cease altogether or become too feeble to keep the tubes distended.

(2.) *Limit of momentum communicated to liquid is that given by propulsive force.*—A second general law is, that pneumatic forces, or, in other words, the pressure of the atmosphere, never can give to the blood a momentum greater than the propulsive force alone is capable of communicating. The propulsive force keeps the coats of the vessels distended; the pressure of the atmosphere forces them inwards in the opposite direction; and if the latter force predominate over the former, immediate shrinking, and at length collapse must ensue. We have only, therefore, to determine the amount of the propulsive force, to determine also the limit within which the atmospheric pressure can promote the circulation without the risk of interrupting it. Now, the propulsive force in any blood vessel is accurately measured by the height of the hæmastatic column which it supports. By turning to the Table in preceding number,* it will be seen that in all the great arteries of the body the hæmastatic column stands at the height of 90 inches. The weight of such a column must press upon every square inch of the internal surface of the arteries, and keep it distended with a force of 3½ lbs. (3 lbs 6½ oz.). In the jugular vein, near the cardiac end of the circuit, the height of the column is nine inches, so that the vein is still kept distended with a pressure of upwards of a quarter of a pound (5·453 oz.) on every square inch of its inner surface. If, therefore, a pump be attached to any large artery, or to the jugular vein, the above numbers indicate, respectively, the utmost momentum which the action of the pump can communicate to the blood without risk of interrupting the circulation. But a much greater force, and even the whole pressure of the atmosphere may be required to communicate to the blood, the momentum just indicated, as will be seen from what follows.

(3.) *If no excess of momentum, any amount of pneumatic force available.*—The third general law, or rather principle, is, that as long as the current resulting from the propulsive force suffers no interruption, either by the failure of the force from behind, or by the too rapid subduction of liquid from before, so long will the pressure of the atmosphere, whatever be its amount, cause only a forward and never a retrogressive movement of the liquid, and so it will become signally effective in removing obstructions to the progress of the liquid.

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* *Glasgow Medical Journal*, Vol. II., No. 1, p. 55.

It is manifest that if there were no propulsive force the liquid would be forced by the pressure of the atmosphere alike forward and backward; but if there be a propulsive force, then the forces acting in a forward direction exceed the force acting backwards exactly by the amount of the propulsive force, and this holds whatever be the amount of the atmospheric pressure; and hence, any amount of that pressure becomes available for overcoming resistances.

Among the obstructions which the atmospheric pressure is capable of removing, may be comprehended those to which the name of normal may be applied, as proceeding from the physical properties of the blood, as from its mass and weight; or from the natural structure of the blood-vessels, their length, their largeness, their tortuous course, their division and sub-division, their ramification in capillary networks, and their subsequent re-union into large venous trunks. Over all of these the pressure of the atmosphere exercises a signal influence so long as it is kept within the limits indicated above. There are even certain accidental obstructions, as the complete occlusion of one or more vessels by compression, or from pathological causes, which can be overcome by the atmospheric pressure, provided there be free passage for the blood through collateral channels.

Apparatus illustrative of the operation of Pneumatic Forces on flaccescent tubes, and of their utility.—This subject will be best illustrated by reference to an apparatus so constructed as to imitate the two great physical conditions under which the circulation of the blood is carried on: viz., (1st), the influence of the action of the heart, at first direct and therefore intermittent, but afterwards delegated and so rendered uniform by the elasticity of the arteries; and (2nd), the influence of the pressure of the atmosphere urging the blood in the same direction.

To imitate the uniform propulsive force with which the blood is urged along the jugular vein, I placed a funnel, supported on a stand, with its upper orifice from 9 to 10 inches from the floor of a leaden cistern; and I so adjusted, by means of a stop-cock, the supply of water from a pipe above, that the funnel was kept constantly full without overflowing. I next attached to the lower end of the funnel a portion of lamb's gut twelve feet in length. I took it so long that it might be longer than the whole vascular sytem, but a much shorter portion is less inconvenient, and answers all the purposes of illustration. In whatever way the gut was placed, if there was no twist in it, the water flowed out at its furthest end without interruption. I now attached a pump to this farther end, and found that it worked with the most perfect facility, — just as great as if the pump had been placed in an open vessel of water. This was the case whether I used a cylinder and piston, the former holding from 1 to 2 oz., or, what I preferred, as being more like the heart, an elastic caoutchouc bag holding more than 2 oz.

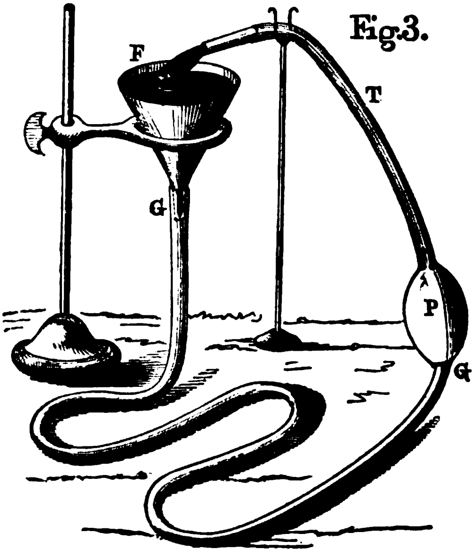
Fig.3.

Stopping the supply from above, I now used the apparatus so as to give an exact representation, according to my views, of the two great forces which keep up the circulation of the blood, and also of the force which acts so beautifully in converting the intermittent stream into an uniform one.

This arrangement is represented in Fig. 3, where F represents the funnel full of liquid, G G, the lamb's gut lying on the floor of the cistern, P, the caoutchouc pump, and T, a flexible tube rising above the level of the funnel, so as to return the liquid into it. This apparatus works with perfect facility, and exhibits a most instructive view of the three forces mainly concerned in the circulation, with this sole difference, that the force of gravity in the apparatus acts the same part almost exactly that the elasticity of the arteries does in the blood vessels. When the pump P begins to act it draws in the liquid by aspiration, and then propels it upward through the tube T, so as not only to urge it along but overcome the force of its gravity. But the force thus expended by the pump is not lost, for no sooner is the liquid injected into the funnel than it reacts with the whole force of its gravity, and produces an uniform current through the funnel and along the whole extent of the lamb's gut to the pump again. Just so the heart propels the blood through the larger pulsating arteries, and at the same time overcomes their elasticity; but the force expended for the latter purpose is not lost, for the elasticity of the arteries reacts upon the blood, and so produces an uniform stream both through the small pulseless arteries and along the capillaries and whole extent of the veins.

I shall now explain in what way the pressure of the atmosphere is of use in removing various obstructions to the progress of the blood.

Mass and weight of liquid.—As the veins are much more capacious than the arteries, the blood accumulates within them, and thus becomes a cause of retardation to its own progress, and so physicians have always dreaded venous plethora as occasioning disease and death. To show the efficacy of the pressure of the atmosphere in obviating such obstructions: suppose the funnel, F G (Fig. 4) to have its tubular portion prolonged into a cistern, C, of any width, and of a depth equal to three-fourths of the column of liquid, F G. From the orifice G, a grooved channel, open above, crosses the cistern to the aperture, H, into which is inserted a tube of the same size as the tube of the funnel, and opening outwards. Then, if the funnel be kept constantly full, it is manifest that the liquid will at first flow into the cistern with great rapidity, and that comparatively little of it will flow out through the tube, H, so that the liquid will accumulate in the cistern. But just as the liquid accumulates it will flow in more slowly, for the height of the column from F to the surface of the liquid is continually diminishing, and it will flow out more rapidly since the height of the column from H to the surface of the liquid is continually increasing. These changes will go on till the influx and efflux are equal, and at that rate they will continue permanent. Now, it is clear that this will happen when the liquid in the cistern has risen to the point, S, for the column, H S, which regulates the efflux, has now become equal to, F S, which regulates the influx, and is just one half of the original column, F G. If, now, a pump be attached to the tube, H, and made to act, the whole liquid accumulated in the cistern will be drawn off; and if the action of the pump be continued thereafter the liquid will never rise above the level of the channel, G H. The flow of liquid through the cistern will, therefore, be effected under the pressure of the whole colum of liquid, F G, instead of the half of it, F S. That is, the action of the pump will increase the moving force from 1 to 1.4142; or, if a circular movement be given to the liquid, the times of complete revolution, with and without the pump, will be as 1 to 1.4142.

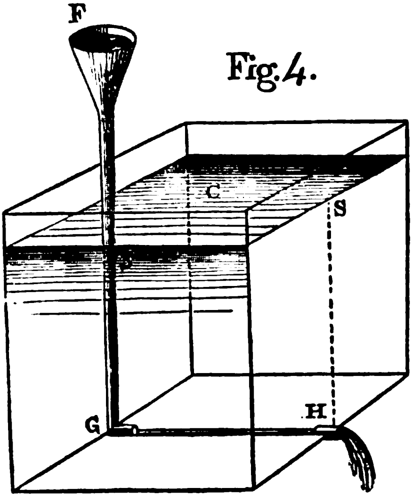

Fig. 4.

It must here be remarked that the liquid which accumulates in the cistern is intended to denote the venous blood accumulating in the veins; for, if the liquid were surrounded by a membranous envelope sufficiently capacious, it would accumulate and be acted on by the weight of the atmosphere, according to the very same laws, and, therefore, to simplify the problem, the membranous envelope has been left out of consideration.

Mass of liquid and narrow aperture.—If the tube, H, be narrower than the tube of the funnel, then a larger quantity of liquid accumulates before the influx and efflux become equal; for, when that takes place, F S, the line from F to the surface of the liquid must be to S H, the line from the surface of the liquid to H, as the diameter of H, the smaller tube, is to the diameter of the larger tube. Thus, if the tube, H, be only in area, a ninth part of the tube of the funnel, the cistern will be quite full before the efflux becomes equal to the influx; for F S is to S H as 1 to 3. In this case, the use of the pump would double the quantity of liquid discharged in a given time, and make a circular movement be performed in half the time.

Obstruction from capillary tubes.—Of the mode in which this obstruction is overcome, the caoutchouc pump which I employed furnished of itself an illustration. To prevent any gross particles getting inside and interfering with the action of the valves, the liquid has been made to enter the pump through four apertures in a brass disc not larger than to admit a needle. Now, if such a disc, unconnected with a pump, were bound across the further end of the membranous tube (Fig. 3) the flow of liquid would be greatly impeded; but it would be again expedited by attaching the pump. The same would hold of a disc perforated with many still smaller apertures, which might be compared to capillaries. But if there were only one or two such apertures, then it is manifest with what force the liquid would require to enter to supply the quantity necessary for the working of the pump, and thus the whole weight of the atmosphere might press upon the membranous tube without any risk of giving to the liquid too high a momentum, that is, of transgressing the limits beyond which the pump would cease to act regularly.

Length of membranous tube.—If the circulation were carried on by a propulsive force alone, the length of the column of venous blood to be pressed along would be one of the principal impediments to its progress. Now, the pressure of the atmosphere is signally adapted to remove this impediment; for the longer the tube the less is the risk of any too powerful action of the pump exhausting the liquid in the tube and causing it to collapse. If a pump be made to act upon an expanse of liquid, the part in which the pump is immersed is not exhausted first, for the air presses upon the whole surface of the liquid, and produces everywhere a simultaneous subsidence of level. Now, the very same happens in an elongated tube lying on a plain surface; for in every part of it the liquid subsides simultaneously, so that the part to which the pump is attached is not emptied more than every other part of it.

If the part of the membranous tube to which the pump is attached be raised perpendicularly, a more or less complete collapse appears on working the pump quickly. The propulsive force of course diminishes just as the pump is raised, and ceases altogther when it comes to the upper level of the funnel, but this is not the cause of the collapse that takes place below that point. It is entirely due to the great shortness of the tube, which is now measured at each successive level by the mere diameter of the tube, but if at any level a platform be formed on which a sufficient portion of the tube can be made to rest, the collapse at once disappears.

These illustrations will suffice for our argument. I have not attempted to enumerate all the impediments to the propulsion of the blood, nor to estimate their relative amount, or the total degree of obstruction which they occasion. I shall, however, point out, hereafter, grounds for believing that, immediately after birth, the circulation is mainly carried on by two forces—the propulsive force of the heart and the pressure of the atmosphere, acting nearly in the proportion of three of the former to two of the latter; but that as life advances, and the quantity of venous blood increases, the latter force becomes relatively more powerful.

(To be continued.)

V.—THE "ANTISEPTIC" TREATMENT OF WOUNDS, WITH SPECIAL REFERENCE TO COMPOUND FRACTURES.

By GEORGE ELDER, M.B., C.M., *General Hospital, Nottingham.*

ON August the 21st, 1867, before the British Medical Association met at Dublin, Professor Lister read his celebrated paper on the "Antiseptic Treatment." Believing that suppuration was the result of decomposition, due to the presence of atmospheric septic germs, he put forward the assumption that, by the destruction of these floating organisms, the production of pus could be prevented. On account of its peculiarly destructive power, carbolic acid was, and is now, the antiseptic used. The paper was interspersed with several cases of compound fracture, chronic abscess, &c., with the double purpose of proving the superiority of the treatment, and of describing the mode of application peculiar to each. From his position as one of the surgeons to the Glasgow Royal Infirmary, Mr Lister has possessed unusual advantages for extending his experience with the antiseptic treatment; and during the more than two years which have elapsed since the reading of his paper, various modifications have been made in the dressings, with the view of making them not only thoroughly efficient, but also easy of application. In the interval, surgeons have had ample opportunity of testing the therapeutical value of carbolic acid, and whilst in the hands of some, limbs have been retained which in former days would have been sacrificed, compound fracture virtually converted into simple, chronic abscesses stripped of their dangers, and pyœmia, erysipelas, and hospital gangrene, from being unwelcome and frequent visitors to our large hospitals seen but rarely; yet with others, men, too, whose names are distinguished in surgery, carbolic acid has been a failure. How can we explain this seeming anomaly? Is carbolic acid capricious or variable, or are its experimenters careless in its application? In his original paper, and frequently since, Mr Lister has impressed upon the medical profession the necessity of not only understanding thoroughly the "germ theory," but also of using the greatest possible care in the application of the antiseptic dressings. After days of careful dressing, one careless dressing is sufficient to undo all the good that had previously been done. In such a case, it is no wonder that the medical man, loath to blame himself, lays the failure to the account of the carbolic acid. Before condemning this or any other treatment, we should try it thoroughly and impartially; record all our cases, and from the facts thus accumulated, draw our inferences. With this object in view, I venture to bring before the readers of the *Glasgow Medical Journal* nine cases of compound fracture thus treated. during the past year, in the General Hospital, Nottingham.

Before doing do so, I shall, briefly, in the first place, give a resumé of the carbolic acid dressings which, at various times, have been used by Mr Lister in similar cases; and secondly, describe more particularly the mode of application practised here. In his first cases, Mr Lister washed the interior of the wound with pure carbolic acid, covered its surface with a piece of lint, dipped also in pure acid, and over all placed tin-foil. The tin cap was raised daily, so that the lint might receive a regular supply of carbolic acid. This dressing was open to the very serious objection, that death of the surrounding tissues was apt to be caused from mere contact with the undiluted acid. Mr Lister overcame this difficulty by substituting in its stead the "carbolic acid putty," which was a solution of one part of carbolic acid in four of linseed oil, and mixed with a sufficiency of whiting to form a paste. Combined in the above proportions with linseed oil and whiting, carbolic acid was efficiently antiseptic without being caustic. Its mode of application was as follows:—The wound having been sponged out as in the previous dressing, its surface was more than covered by a piece of lint saturated with an oily solution of carbolic acid, (1 in 4) and above all the "putty" was laid. So long as any discharge came from the wound, the paste was changed daily, without disturbing or interfering in any way whatever with the lint. When the discharge had ceased, the putty application was discontinued, and the layer of lint being left, the wound healed by "scabbing." Although efficient, yet from the nature of its components, this dressing was dirty and unwieldy, and, from its frequent renewal, inconvenient. An antiseptic dressing was required which, whilst being trustworthy, would be also easy of application; and before the Medico-Chirurgical Society of Glasgow, in the month of October, 1868, Mr Lister described the "lac plaster"—a combination of shell-lac and carbolic acid, in the proportion of 3 of the former to 1 of the latter, which seemed to answer every purpose admirably. Its adhesiveness was its only objection. In some cases an exit for the discharge was indispensable; and, at first sight, this difficulty seemed insurmountable, but was overcome by coating the plaster with a very thin layer of gutta percha tissue. On the contrary, in the case of a compound fracture, the more adhesive the antiseptic application the nearer does it approach in character a simple one. Mr Lister applied the "lac plaster" in the following manner:—Having syringed the wound out with a watery solution of the carbolic acid, (1 in 20) a piece of block-tin, previously washed with same solution, and larger than the wound, was laid over it, and above all a sufficiently large piece of the plaster, divested of its gutta-percha coat, and painted with liquid carbolic acid. It will be noticed that by this time Professor Lister had discontinued using the pure acid for the purpose of washing the interior of the wound. The pure acid not only destroyed the tissues with which it came in contact, but also at times produced unfavourable constitutional symptoms. By the employment of the watery solution, these objectionable effects were obviated, whilst it contained a sufficient quantity of carbolic acid to destroy the putrefactive organisms. Since the introduction of the "lac" plaster Mr Lister has made no important modification in the dressing of compound fractures.

In the nine cases of compound fracture which have been treated during the past year at this hospital, the "lac" plaster has been used, but in a somewhat different manner from that recommended by Mr Lister. The amount of mischief, both to the bony and soft tissues, having been ascertained, a quantity of the watery solution, varying according to the extent and nature of the injury, is injected into the wound. This having been done effectually, a piece of plaster larger than the wound, divested of its gutta-percha tissue, and smeared over with liquid carbolic acid, is applied to its surface. Between the "lac" and the wound no block-tin intervenes. The antiseptic dressing is retained in position by means of strips of adhesive plaster. In the case of compound fractures of the leg, after reduction and application of the dressing, the limb is placed in a "swing cradle," and enveloped in the folds of a many-tailed bandage, so that there is always ready access to the seat of injury. In some of the cases a greater amount of adhesion and moulding to the parts was got by holding the plaster, minus its gutta-percha coating, for a very short time before the fire prior to treating it with the liquefied carbolic acid. This dressing was of course renewed regularly. I have tabulated the cases thus treated, so that at a glance the reader may be possessed of all the points of interest.

1.—*Compound comminuted fracture of both bones of the left leg.* Wm. Barlow, aged 19. Under treatment 9 weeks. Dismissed well.

2.—*Compound fracture of both bones of leg.* Robert Luss, aged 38. Under treatment 6 weeks and 2 days. Dismissed well.

3.—*Compound fracture of both bones of left forearm.* Sarah Watts, aged 13. Under treatment 8 weeks. Dismissed well.

4.—*Compound fracture of left humerus.* Henry Peach, aged 11. Under treatment 12 weeks. Dismissed well.

5.—*Compound fracture of tibia.* John Elvidge, aged 39. Under treatment 6 weeks. Dismissed well.

6.—*Compound fracture of tibia and fibula.* John Wood, aged 31. Under treatment 16 weeks. Dismissed well.

7.—*Compound fracture of tibia.* Charles Napier, aged 34. Under treatment 8 weeks. Dismissed well.

8.—*Compound fracture of both bones of left forearm.* Fred. Smith, aged 7. Under treatment 41 days. Dismissed well.

9.—*Compound fracture of tibia.* Thomas Gregory, aged 56. Under treatment 6 weeks. Dismissed well.

Analysing these cases, it might be supposed that in cases 1, 4, and 6, which were respectively 9, 12 and 16 weeks under treatment, carbolic acid had somewhat failed, but in reality they signally illustrate its efficiency, as a few details will show. In the case of Wm. Barlow, both bones of the leg sustained compound comminuted fracture, by the falling of a large piece of coal whilst at work in a mine. In addition, there was such extensive destruction of the soft parts, that carbolic acid was tried, as offering the only chance, and that seemingly a very slight one, of saving what might be a very useful limb. His stay in hospital was prolonged some time after the wound communicating with the fractured bones had healed, by a nasty sloughing sore on heel. Case No. 4 was a very bad compound comminuted fracture of the humerus entering into elbow joint. After the removal of several pieces of loose bone, the antiseptic dressing was applied. In this case, healing took place by granulations, and was necessarily slow. In neither of the above mentioned cases did any constitutional symptoms show themselves. Case No. 6 was that of a burglar, who in attempting to evade pursuit, jumped from a wall 33 feet high. In addition to the compound fracture which his leg sustained, his whole system received such a shock that for many days his life was despaired of. A more unfavourable case for the employment of carbolic acid could not well have been found, yet the man retained his limb. In the other six cases the success of the antiseptic treatment was unequivocal and decided. Fortunately, pyœmia and hospital gangrene are known to us only by name, so that with the inhibitory influence of carbolic acid over these diseases I am not practically acquainted.

VI.—CASE OF OVARIOTOMY.

By GEORGE BUCHANAN, A.M., M.D., *Surgeon and Lecturer on Clinical Surgery, Glasgow Royal Infirmary, Professor of Anatomy, Andersonian University, &c.*

TWENTY years ago ovariotomy was an operation of more than doubtful reputation. Except in the hands of Dr Clay, of Manchester, the isolated cases performed by other surgeons had yielded very unfortunate results. The improved methods of operating introduced since the period referred to, by Mr Spencer Wells and others, and particularly the system of after treatment, have produced a complete revolution in the minds of the profession; so that, now it is accepted as one of the most brilliant and satisfactory of the major operations of surgery. During the first ten or fifteen years of its fresh re-introduction it became all-important that its advocates should secure a complete report of all the cases in which it was performed, whether the result was good, bad, or indifferent, in order that, by numerical statistics, it might be proved to the doubting that it was a proceeding worthy of being adopted as a means of saving life and restoring health. That period of doubt has now passed away, for the numerous reports which have appeared in the various medical periodicals have sufficiently proved not only that the operation is justifiable, but that, in properly selected cases, the prospect of a favourable issue is nearly certain. The interest of the subject, therefore, now lies, not in the establishment of a general average of success, but in the study of individual cases, with the view of elucidating the conditions which are favourable to operation, and the after treatment which is most successful in its results. The following example is recorded accurately but concisely. I have found, in operations in private, that the simplest way to convey to the family attendant my wishes as to the after treatment, is to put into his hands a record of one or two of my previous operations as a guide; and with a similar desire to assist those into whose hands may fall the direction of such a case, I now record the particulars of my twenty-first operation.

Mrs S——, aged 27, married, without any family, menstruating regularly, about two and a half years ago perceived a fulness in the abdomen. It gave her little uneasiness, and no trouble until the spring of 1869, when she consulted Dr William Greenlees. In June I saw her, along with Dr Greenlees, and we diagnosed a large fluctuating ovarian tumour. The uterus was natural, and there was no impaction in the recto-uterine pouch. At one part, close underneath the liver, there was considerable hardness, and in that situation there had been frequent attacks of severe pain. I feared that these peritoneal pains might have resulted in adhesion of the more solid portion of the tumour, and proposed tapping as an aid to the diagnosis. We tapped it in the beginning of July, and drew off a large quantity of dark brown viscid ovarian fluid. Although the removal of the fluid left a considerable solid mass, I had the satisfaction of finding that the whole tumour fell down to the lower part of the abdomen, shewing that no important adhesion existed in its upper part.

The sac rapidly refilled, and I performed ovariotomy, with the assistance of Drs Greenlees and Connell, on the 11th of August.

The incision extended from one inch above the umbilicus to just above the pubis. I made the incision large, to allow of the easy extraction of the solid part of the sac. Before introducing the large ovarian trocar, I had to separate with the finger several strong omental adhesions, but these were only on the front and sides of the tumour, and being twisted off, gave rise to no hæmorrhage. The removal of the fluid reduced the tumour to one fourth of its size, and it could then be easily drawn through the incision. The pedicle proved to be a long thin band, containing some large vessels. By placing the clamp close to the tumour, the pedicle was left long enough to allow the uterus to slip into the pelvis without any tension. A little blood having escaped into the pelvis, it was most carefully removed by soft moist sponges, after which the wound was closed by silver sutures.

The tumour and its contents weighed fifteen pounds. The sac alone, after the fluid was all removed, weighed two pounds. It was a large sac, with a thick part containing multilocular cysts. I saw the patient daily for nearly a fortnight; but Dr Greenlees visited morning and evening, and made the following reports :—

10 P.M.—Pulse 140. Tongue moist. Pain general. Had a little sleep. Considerable thirst. Has had nothing but a few small bits of ice. To have 68 drops of laudanum by enema.

August 12th, 10 A.M.—Pulse 96. Tongue moist. Pain not much. Four hours' sleep. Great thirst. Nothing but ice.

10 P.M.—Pulse 108. Tongue moist. Pain not much. Sleep one hour. Thirst great. Ice. Opiate enema every night.

13th, 10 A.M.—Pulse 112. Tongue moist. Pain considerable. Sleep very little. Thirst great. Ice and a teaspoonful of beef tea every two hours.

10 P.M.—Pulse 130. Tongue moist. Pain in back great. Sleep none. Thirst great.

14th, 10 A.M.—Pulse 108. Tongue moist. Pain less. Sleep, seven hours, at intervals. Thirst less. Had tea and an egg to breakfast. A tablespoonful of beef tea every two hours.

10 P.M.—Pulse 112. Tongue moist. Pain a good deal. Sleep, 1 hour. Thirst less. Enjoys the beef tea, but could take more.

15th, 10 A.M.—Pulse 116. Tongue moist. Pain less. Sleep, five hours. Thirst less. Had some porridge and milk. Increase the beef tea, and have some arrowroot.

10 P.M.—Pulse 100. Tongue moist. Pain very little. Sleep, five hours. Little thirst. Enjoyed food.

16th.—Pulse 96. Tongue moist. Pain almost none. Sleep, seven hours. No discharge from wound, except a few drops round the clamp.

17th.—Pulse 84. Tongue moist. Pain none. Porridge, tea, an egg, beef tea.

18th.—Pulse 84. Seven hours' sleep. To have a chop.

After this the progress to recovery was almost uninterrupted.

Till the tenth day, the urine was drawn off with the catheter regularly every eight hours—the nurse in attendance being able to do that.

The clamp dropped off on the eighth day, when the silver sutures were also removed—the wound being united throughout, with the exception of the stump of the pedicle; a little discharge coming daily from it, and filling the little depression in the wound caused by the retrocession of the pedicle. I found the best way to keep it from accumulating and soiling the bandage was to put a little bit of sponge into the depression, changing it morning and evening.

The bowels were moved by a dose of castor oil on the tenth day; after which the patient passed urine naturally.

Remarks.—With reference to the treatment, it will be noticed that the bowels were kept from acting by opiate enemata till the clamp came away, and the wound was united. During the same time the urine was regularly drawn off by the catheter to prevent any straining on the part of the patient. The smallest quantity of the most concentrated kind of food only was allowed; all which measures were adopted to ensure as much rest as was possible to the bowels and the abdominal walls. The matter of food is most important, and I think it might be made of more general application. Judging from the benefit I have seen from withholding all food but a little bit of ice for the first twenty-four hours, and giving only a teaspoonful of concentrated beef tea every two hours for the next day or two, I have adopted the same treatment in the case of other major operations, to the great comfort of the patient; especially in operations about the face, neck, chest, or abdomen, which are apt to be disturbed by the vomiting, which is so often caused by food taken a short time after the administration of chloroform.

The abstinence also favours the action of an opiate, if it be necessary to give one either to soothe pain or quiet nervous irritability. With regard to opiates, I have now almost altogether adopted the plan of giving them as enemata—finding that they are absorbed by the rectum so as to ensure their effect almost as certainly as if taken by the mouth, and without any risk of disordering the stomach.

The results of ovariotomy in favourable cases are peculiarly agreeable to the surgeon, and a sufficient reward for the anxiety he experiences as to its issue during the first few days. A woman doomed at no distant date to a painful and lingering death is restored to health, often to the domestic duties of a wife and mother. In two of the cases I have operated on, not only is this the result, but they have since borne children, the second ovary remaining in its natural state.

VII.—ON WHISKY AS AN ANTISEPTIC DRESSING IN SURGERY.

By David Blair, M.D., *Ballachulish.*

Referring to a method of treating wounds recently introduced into practice in some of the Parisian hospitals, viz., by the application of alcoholic lotions,—a friend, who was aware that in the district where for a time I practised it was customary to treat wounds by this method, has suggested that I should give some account of my experience in reference to it. This, then, is my apology for occupying so much of the *Glasgow Medical Journal* with a subject which, probably, may be considered by some neither interesting nor original. It may serve a good purpose, however, if I am able to bring forward a few cases in confirmation of the beneficial results of the system of treatment now so fully developed by the ingenuity and perseverance of the eminent Professor of Clinical Surgery, Edinburgh, and it affords myself much gratification that my experience corroborates his views as regards the treatment of wounds by antiseptic lotions.

I presume it is now generally admitted by surgeons that the antiseptic treatment of wounds is the one which gives the best results. Or to put it in another form, that the substances known as antiseptics, when used as dressings to wounds, are those which afford the best results. Alcohol has a fair claim to be recognised as belonging to this class of medicines, for I think, it cannot be denied that it is an antiseptic of no mean power, and further, as I shall show, it is one which has been long and successfully used in surgical practice. As to the theory on which this practice has been based, I have nothing to say; but I know that the practice is much older than the theory, at least, I had seen the practice long before I heard of the septic germ theory.

As a popular application to wounds, I have seen whisky used for many years—long before I ever thought of entering the medical profession, and since I became a member of this profession (more than nine years ago), I have almost invariably used it as a dressing in all the more serious cases that came under my care. I know not to whom the credit belongs of introducing it into practice for this purpose, and I cannot remember who taught me its use, as every one around me in youth knew its value, and in all wounds, both in human beings and the lower animals, it was applied.

The district (Islay) in which for eight years I practised medicine, is one where whisky distillation is carried on extensively, and where, consequently, as may be inferred, this article can be got undiluted and unadulterated. In any serious cases of accident in which it may be recommended by the medical man, the distillers very liberally give it in the pure state, to be applied under his direction. From this source the poorer classes, who could not otherwise obtain it on account of its high price, are often supplied, and thus the medical attendant is enabled to adopt this treatment in any case for which he may think it applicable. As a dressing to wounds, I have found it not only efficacious, but what is a great recommendation to its use, especially in country practice, it is easily applied. In the wards of an hospital, with the assistance of well-trained nurses, and all the other "appliances and means to boot," it is comparatively easy to carry out any line of treatment, however difficult or complicated its manner of application; but in general practice, and particularly in extensive country districts, where patients are not unfrequently many miles distant from the medical practitioner, and where necessarily much of the treatment must be entrusted to attendants who are not at all times very intelligent or trustworthy, it is of great importance to employ simple means, and nothing can be simpler or less troublesome as a dressing to wounds than spirit lotions. I usually apply the whisky as follows:—

To remove foreign substances or clotted blood, the wound is first washed thoroughly with strong whisky, it is then closed with stitches if necessary; again bathed with whisky, and covered by a rag and bandage both saturated with the same fluid; and finally, all is enveloped in gutta percha tissue or oiled silk, and directions given to the attendants to wet the bandage from time to time with the spirits. As a rule, the first dressing is not disturbed for three or four days, and, afterwards, it is changed every day, or every second day, according to circumstances. The principal thing to be attended to is to have the bandage kept wet with the whisky—but not *too wet*, or it will impede the progress of the cure. I have never seen *much* sloughing, and I have not once seen erysipelas occur in wounds treated in this way. Probably because septic germs, if they exist at all, are not numerous in our hyperborean regions.

Since I left Islay, a year ago, I have not used whisky in all my cases of wounds, still I have used it occasionally, and its value has not diminished in my estimation, although I have tried carbolic acid and other antiseptics. The following cases may be given in illustration :—

Case 1st.—J. M'P., a boy, aged ten years, was amusing himself near a corn thrashing machine, his hand got entangled in the wheels, and before they could be stopped, the middle finger and its metacarpal bone were crushed to pieces, the palm of the hand was lacerated severely, the ring finger was denuded of the flesh on the palmer aspect, but the bone was not broken. The boy, having been put under the influence of chloroform, I removed the lacerated part and injured bone, then dressed the wound with strong whisky. The following day, when visited, the boy was sitting by the fireside, supporting his hand on a pillow laid on his knee. He was quite comfortable and cheerful, and could not be induced to remain in bed. I need not detail the progress of the case, suffice it to say that the hand healed rapidly, and I ceased attendance in three weeks.

Case 2nd.—Boy, 8 years, had his hand caught between the wheels of a hay crushing machine, which was driven by a horse. Before the animal could be stopped, the hand of the boy was fixed in, and the arm drawn round the wheel so firmly that the little fellow could not be extricated until the machinery had been turned backwards. The thumb and next two fingers were torn off at their articulation with the metacarpus. The palm of the hand and inner aspect of arm up to axilla were lacerated so badly that we feared it would not be possible to save the whole arm ; the metacarpal bone of the thumb was smashed, and had to be wholly removed. We resolved to take away, in the first place, only what was strictly necessary of the hand, and give the arm a chance of recovery. The parts were wrapped in cloths with whisky, in the usual way, and the friends directed to wet the bandage two or three times daily. On the fourth day we removed the dressing for the first time; there was no discharge, no inflammation, no swelling. The arm looked well; the case went on uninterruptedly, and I only required to see him thrice.

Case 3rd.—J. S., aged about 60, had his finger crushed by machinery; amputated part of two of them. Applied whisky; no inflammation, no suppuration. Result good.

In other three cases of amputation of the finger I used it with equal success.*

I have also used whisky as an application to bed sores. When fever occurs epidemically in country districts and villages, especially in the Highlands, it generally causes a panic among the inhabitants. The dread of contagion is so great that occasionally no one will venture to undertake the duties of nurse; under these circumstances bed sores are of frequent occurrence. I have seen more than one case in which the os sacrum and coccyx were exposed from sloughing in typhus, and yet the patients recovered. The bed sores were treated with linseed and oatmeal poultices, mixed with whisky, until the slough separated, then whisky lotions were applied.

In cases of chronic and scrofulous abscess, I have used whisky as an injection, and find that it checks the discharge and hastens the cure. In a case of scrofulous abscess of the hip joint I attribute the recovery of my patient to its having been used in this way. The pain and hectic before and for some time after the abscess was opened, caused so much prostration that I had slight hopes of my patient's recovery. I persisted, however, in using the injections two or three times daily, bathed the whole limb often with spirits, and kept it wrapped in cotton wadding and a bandage. The stomach for a time would not tolerate solid food of any kind, and even beef tea provoked nausea. Notwithstanding, in an incredibly short time, my patient rallied, and I had the pleasure of seeing him able to walk well, although the joint continued somewhat stiff.

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* In these cases, with one exception, I was assisted by Dr Campbell.

In a singular case of abscess, situated beneath the muscles in front of the abdomen, which opened at the umbilicus, I was highly pleased with the result gained by these injections. The discharge obstinately continued, although I perseveringly applied for a considerable time poultices and lotions of different kinds; at last, I resolved to inject with strong spirits, but from the peculiar situation of the abscess, and fearing inflammation might supervene, I used it very cautiously at first, but no unfavourable symptom having followed the first application, by degrees it was used more freely—two or three syringefuls at a time repeated twice or thrice daily. In a few days there was a marked improvement, and soon the discharge ceased completely, and the patient is now well.

The following extract from a letter received from my friend, Dr M'Indeor, Bridgend, Islay, to whom I wrote some time since to ascertain his opinion on the subject, I insert with much pleasure:—

> "As to the use of alcoholic lotions in cases of wounds and amputations, I can only say that during the whole of my practice, now extending over a period of fifteen years, I have always had recourse to the application of alcohol, and in no case have I found the treatment otherwise than successful.
>
> "As to the antiquity of its use I cannot speak, but from my earliest boyhood I well remember this treatment was had recourse to with good effects in wounds and bruises on horses, &c., and I concluded that what was found so effectual in these cases should be equally so in regard to the human subject. I could, in my own experience, multiply cases to which I might refer, but think it unnecessary."

In conclusion, let me hope that these cursory remarks may serve to direct the attention of members of the profession to alcohol as an application to wounds, and help to vindicate its claims to be acknowledged, not as a new agent in the resources of surgery, but as the revival of an old one; another illustration, is it not, of the oft-illustrated saying, that there is nothing new under the sun.

VIII.—CLINICAL OBSERVATIONS ON HYDRATE OF CHLORAL AS A HYPNOTIC IN TYPHUS.

By **JAMES B. RUSSELL**, B.A., M.D., *Physician to the City of Glasgow Fever Hospital.*

NEW therapeutic agents often disappoint those who are not satisfied with mere novelty, and who prefer old and tried methods of producing effects to those which are commended by their strangeness rather than by superior efficiency. The hydrate of chloral, as an anæsthetic, will scarcely rank even with protoxide of nitrogen and bichloride of methylene, in feeble rivalry of chloroform. As a narcotic, on the contrary, I believe that it will establish itself as not only new, but specially useful, preferable in certain circumstances to opium. In the treatment of the cerebral complications of febrile disease, opiates have proved in my experience, sufficiently capricious, and even precarious, to lead me eagerly to make trial of new sedatives, in the hope of finding among them one safer and even more certain in action. The hydrate of chloral has proved so successful in both respects that I hasten to state the results of even a limited trial.

I shall first present, in a tabular form, such information as to the circumstances of administration, the dose, and results, as can be so compressed; and then make some remarks, founded on this table, and on the minute clinical notes, taken in some cases by my assistants, Drs Tennent and M'Kellar, but mostly by myself. At the outset I must apologize for their scientific defects. In the midst of an epidemic, with crowded wards, it is impossible to extend observations beyond the easily notable and practically useful phenomena. The hypnotic action of chloral was, therefore, almost solely watched for; such phenomena as the temperature being necessarily left over for future study.

TABLE OF RESULTS OF ADMINISTRATION OF CHLORAL IN TYPHUS.

No. of Case.	Circumstances preceding Administration.	Day of Fever.	Age.	Dose.	Slept.		Effect short of Sleep.	Condition Afterwards.	REMARKS.
				Grs.	How soon. Mins.	How long. Hrs.			
I.,	14 hrs. A.D., ...	2nd week.	25	40	(20)	Prolonged and broken.	...	Unchanged.	Pulse irregular 3 hrs. afterwards.
—	(Same case.)	Do.	...	30	...	...	*	...	Vomited at once.
—	Do.	Do.	...	40	10	3	...	No recurrence.	Stimulated. Pulse not irregular.
II.,	5½ hrs. D. Ferox, ...	10th. ...	25	40	(30)	2	...	Rational for a time, but	... ...
—	(Same case,)	12th. ...	...	40	...	...	†	D.recurred next day.	... ...
III.,	D.T. of Typhus, ...	19th. ...	20	40	(30)	5	...	Unchanged.	Pulse irregular 11 hrs. afterwards.
IV.,	D.T. of Typhus, ...	2nd week.	40	20	15	2	...	No recurrence.	Do. 5 hrs. afterwards.
V.,	Acute Mania, ...	...	30	20	5	3½	...	Unchanged.	... ...
VI.,	D.T. of Typhus, 22 hrs. without sleep, ...	14th. ...	19	20	30	4	...	No recurrence.	... ...
VII.,	Night of A.D., ...	? ...	3	3	20	Prolonged and broken.	...	Do.	... ...
VIII.,	D.T. of Typhus, 26 hrs. without sleep, ...	14th. ...	28	20	2 hrs.	4	...	Unchanged.	... ...
IX.,	Nearly 3 days sleepless,	? ...	3	3	8	2½, broken.	...	Do.	Tubercular Meningitis, with T.
X.,	Sleepless night. ...	13th. ...	19	20	...	...	§	Do.	... ...
XI.,	Do. ...	11th? ...	30	20	10	½	...	Tranquillized.	... ...
—	(Same case,)	13th? ...	...	20	...	...	§	...	... ...
XII.,	D.T. of Typhus, ...	10th. ...	47	20	...	...	†	Unchanged.	... ...
—	(Same case,)	Do. ...	...	30	12	Short and broken.	...	Do.	... ...
—	Do.	12th. ...	...	20	...	Do.	...	Do.	... ...
XIII.,	36 hrs. A.D., ...	10th. ...	18	20	...	...	†	Do.	... ...
—	Sleepless night, ...	12th. ...	...	20	70?	Short and broken.	...	Tranquillized.	... ...
—	D.T. of Typhus, ...	19th. ...	...	15	10	Prolonged and broken.	...	No recurrence.	... ...
XIV.,	A.D. all night, ...	9th. ...	9	10	7	Do.	...	Do.	... ...
XV.,	36 hrs. sleepless, ...	? ...	1½	2	10	Short and broken.	...	Unchanged.	... ...
XVI.,	A.D. all night, ...	13th. ...	13	20	...	...	§	...	... ...
—	(Same case,)	Do. ...	...	20	At once	Prolonged and broken.	...	No recurrence.	2nd dose 9 hrs. after 1st.
XVII.,	A.D. for 36 hrs., ...	? ...	14	10	15	Do.	...	Do.	... ...
XVIII.,	D.T. of Typhus, ...	12th. ...	23	20	...	...	†	...	... ...
—	(Same case,)	14th. ...	...	20	15	3	...	Unchanged.	... ...
—	Do.	15th. ...	...	20	15	Prolonged and broken.	...	No recurrence.	... ...
XIX.,	D.T. of Typhus, ...	15th. ...	29	15	2 hrs.	3	...	Unchanged.	... ...
XX.,	D.T. of Typhus, ...	? ...	22	20	(30)	3½	...	No recurrence.	... ...
XXI.,	A.D. for 36 hrs., ...	10th. ...	12	15	(25)	Prolonged and broken.	...	Do.	... ...

Note.—A.D. = Acute Delirium. (—) Asleep then, but not observed how long. D.T. = Delirium Tremens. * Inert. † Partially soothing. § Decidedly soothing.

Physiological action of chloral.—Although the chloral was administered for therapeutic ends, the notes of these cases, in some particulars, illustrate the observations of Liebreich, Bouchut, Personne, and Richardson, as to its physiological effects. The full development of these effects depends, of course, upon the dose; and since, from the papers of these gentlemen, I was led to exhibit, at first, what proved to be an overdose, viz., 40 grains, the action of the drug went further than was necessary. I therefore give the notes of two such cases in full. At the close of the paper will be found some speculations as to the cause of this susceptibility.

CASE I.—Janet N., aged 25, on 12th Dec., 1869, had been six days in hospital with very severe typhus of unknown duration, aggravated by debility from 15 months' lactation. On the forenoon of that day, although her pulse was falling and her bowels were free, *she had not slept for* 14 *hours*, but had sung and talked constantly, and was only held in bed by the canvas sheet.

12.50 *p.m.*—Pulse, 120; good. Temperature in rectum, 100·5°. Face flushed and whole aspect excited. *At this hour* 40 *grains chloral were given.*

1.10 *p.m.*—Pulse, 118; decidedly *smaller and softer*, and indeed *seems to falter at times.* Lies quietly half on back; eyes shut; respirations interrupted by a constant short cough. Eyelid lifted without awakening patient; *pupil almost pin-hole.* On pinching arm severely she awakes, looks up, and *pupils, at first small, become natural.* Coughs, and dislodges a quantity of mucus.

1.30 *p.m.*—Pulse, 124. Roused by nurse, contrary to orders, to take milk, and is, though not restless, noisy.

2.20 *p.m.*—Pulse, 112; soft. Quiet; saying "Awe! awe!" in a dreamy tone.

3 *p.m.*—Pulse, 110; soft. Still more absent and drowsy, but repeating "awe! awe!"

3.40 *p.m.*—Pulse, 84; small, *feeble, irregular.* As before; tranquil.

4.20 *p.m.*—Pulse, 82 to 86; *improved in quality, but irregular.* Same dreamy tranquil state. Evidently alive to what is being said. Passed urine in bed.

5 *p.m.*—Pulse, 92; *improved in quality, and rather steadier.* General condition unchanged.

5.40 *p.m.*—Pulse as before; asleep, but wakened by counting it. Has had no food or stimulant since draught. Give milk.

6.20 *p.m.*—Pulse, 112; *quality good, and quite regular.* Temperature in rectum, 102·5°. No more sleep; passive; talking to herself.

8.20 *p.m.*—Pulse, 120; good. Quiet, but talking, and waving hands in air. 30 *grains chloral in half-an-ounce of water and syrup given, but vomited at once.*

11 *p.m.*—Pulse, 120. Excited, and constantly chattering. *Give* 40 *grains chloral again, in* ℥iss. *water and syrup.*

11.30 *p.m.*—Pulse, 116; much softer. Patient became quiet in about *ten minutes after draught*, and now *sleeps calmly.* Respiration is sometimes slow and full, sometimes hurried and short.

Dec. 13*th.*—*Slept for three hours after last dose;* then became wakeful and excited for about 6 hours, but again slept soundly. Patient *never became restless again*, but passed into convalescence.

CASE III.—Helen C———, aged 20, was in the 19th day of severe typhus, with *general bronchitis* and *partial congestion of lungs;* bowels free; *delirium of nervous semi-hysterical type.*

Dec. 16*th*, 12.30 *p.m.*—Pulse, 120; good. No sleep for some 48 hours. Got 40 *grains chloral at this hour.*

12.40 *p.m.*—Pulse, 120; still awake and chattering. Face blue; flushed.

1 *p.m.*—Pulse, 110; full and strong. Respirations 46; full and deep. *Sleeping soundly;* not disturbed by counting pulse.

1.30 *p.m.*—Pulse, 108; soft; asleep, but roused by counting pulse.

6.40 *p.m.*—Pulse, 136. Slept till 5.40; at times talking, but always falling over again. Is now in peevish delirious state once more.

11 *p.m.*—Pulse, 136; *intermits three times in* 15 *seconds.* Give teaspoonful of whisky every hour and Liebig.

17*th.*—Pulse, 124. Had a restless night, but afterwards, although irritable and hysterical, obtained abundant sleep, and recovered, although tediously.

In these cases, after a 40 grain dose, the toxic effect upon the heart was manifest. In one case only, the 4th, irregularity was developed by so small a dose as 20 grains, but lowered frequency was not uncommon. The large dose was given also twice to a bulky, robust man, but did not affect the heart, so far at least as to cause irregularity. The pulse seemed, but with exceptions, at first and that speedily to improve in quality, but in an hour it became soft and small, sometimes lowered in frequency, and finally the action of the heart became irregular. Although it is difficult to eliminate from the sedative effects of mere repose on the respiratory and circulatory organs of a delirious person, those which are due to the drug which induces the repose, there can be little question that the chloral acted directly and specially on the heart in these instances. In many of the cases also, from the aspect of the countenance, flushed and full, and from the improved colour of the rash, brightening when petechial,—the impression of stimulated action which we have said the pulse at the very first, and for a short time, conveys, receives further confirmation. The breathing also is quickened and short, but not laboured. These phenomena are, however, of the most transient description, and soon give place to those with which we are familiar in natural sleep. The state of the pupil is the same—contracted to the utmost, as in the "pin-hole pupil" of Graves;

but, differing from the contracted pupil of narcosis, it expands in the chloral sleep immediately the patient is awaked. The power of voluntary motion seemed never to be in abeyance, but always at command as in natural sleep; and no change in the susceptibility of sensation was present. The sedative effect on the brain and nervous system was sometimes visible in a few minutes, but seldom became developed into true sleep and unconsciousness until from 10 to 20 minutes. The transition from waking to sleeping was noted to be often very sudden. If disturbed by any external or internal irritation, as by counting the pulse, for instance, the patient often looked up, with natural or dilated pupil, then turned on one side, seemed to sleep *at once*, and on lifting eyelid, no movement was caused, and the pupil was found to be almost abolished. According to Richardson, thorough narcosis from chloral is accompanied, in the rabbit at least, by dilated pupil. In Case I., it will be observed that the pupil remained for a perceptible period contracted, as in opiate narcosis, after the patient had been roused by pinching. Dilatation was never observed from the doses employed in my cases.

Therapeutic action of chloral.—The therapeutic action desired was sedative and hypnotic, and as such the table shows that it was successful in almost every form of cerebral excitement incident to febrile disease, with remarkable uniformity and rapidity. Case II. illustrates its efficiency in a well-marked instance of *delirium ferox.*

CASE II.—Archibald B———, aged 25, on the 10th day of well-marked typhus, without previous warning, after a good night's sleep, suddenly jumped out of bed, and smashed a window in his endeavours to escape through it. Was forced into bed against violent resistance, and retained there by jacket and sheet. Bowels quite free.

Dec. 15*th*, 2.30 *p.m.*—*After a pertinacious resistance*, 40 *grains chloral was administered.*

3 *p.m.*—Pulse, 96. Apparently *sleeping quietly.*

4 *p.m.*—Evidently sleeping soundly.

7 *p.m.*—Pulse, 96; soft. Slept about 2 hours altogether. Is now awake, but *quiet and rational.*

17*th*, 2.30 *p.m.*—Pulse, 132. Has been sleepless since last note, and is now as violent as ever. 40 *grains chloral again given.*

3 *p.m.*—Pulse, 128; fuller. No sleep. Nurse thinks him quieter; but *no effect further than this followed this dose.*

Patient died on 15th day.

Chloral seems to have a more immediate and permanent curative action on such cases of acute delirium, at the acme of typhus, than in the *delirium tremens* of the second and third weeks, when the blood is loaded with the products of the fever and there are general tremors and subsultus.

In the former class of cases, its action was sometimes quite magical, as in Case XIV., for example, where, in 7 minutes, the patient was calmed from a state of fiery excitement.

CASE XIV.—Ellen T———, aged 9. Well-marked typhus.

Jan. 8th, (9th day) 12.58 *p.m.*—Pulse, 140. After *sleepless night*, spent in shouting and getting out of bed, *got* 10 *grains chloral at this hour*. Bowels free. Pupils slightly dilated.

1.5 *p.m.* (7 minutes after)—*Quite quiet*, but opens eyes dreamily for a second as I look at her.

1.20 *p.m.*—Pulse, 128. Respirations, 48. *Sleeping soundly*. Aspect calm and perfectly natural. *Pin-hole pupils*.

11.30 *p.m.*—Pulse, 128. Has been *always tranquil*, *generally sleeping*, *throughout the day*.

No recurrence of delirium. Recovered.

Case XVII. is an equally good example, where two hours' unbroken sleep, followed by interrupted sleep during the entire day, was produced by 10 grains in a boy of 14. In both instances the patient became sensible and continued so. This permanently curative action was frequent, as the table shows, and more common in the active than in the adynamic form of delirium. Although this adynamic delirium, or the *delirium tremens* of typhus, as I call it, was less promptly amenable to chloral, as it is to all sedatives, Cases VI., XIII., and XVIII. show excellent results. Indeed, there is no other sedative but chloral which I should have ventured to administer, still less to repeat, in the last two. Seeing that the delirium depends in such cases on the presence of impurities in the blood, the elimination of which is a process requiring time, all that we can expect from a sedative which does not act by hastening elimination, is to soothe from time to time, and to check vital exhaustion until the process is completed by the natural channels. In this aspect, the chloral appears in no case to better advantage. We shall quote Case XVIII. as an illustration of its beneficial action in one of the worst cases of such adynamic delirium I have ever seen. It will be observed that it even controlled the subsultus for a time.

Case XVIII.—John M'D——, aged 23. Very severe case of typhus, with prominent cerebro-spinal symptoms from the 10th day.

Jan. 14*th*, (12*th day*) 2.30 *p.m.* Pulse, 128. Pupils natural. No sleep during night. *Delirium tremens of typhus;* ceaseless chattering, movement of hands in air, universal twitchings. *Got* 20 *grains chloral at this hour.*

7 *p.m.*—Pulse, 130; small and soft. Has been seen at intervals, and there has been *no sleep whatever.* Nurse thinks him on the whole quieter, but this is doubtful.

15*th* (13*th day*)—Pulse, 114. Nervous symptoms abated, but not a wink of sleep. No motion for two days. Give castor-oil.

16*th* (14*th day*)—Bowels were moved yesterday by the oil. Still, has had *no sleep since the* 13*th.* Nervous symptoms aggravated. Every muscle seems to twitch in turn. Rash petechial and copious.

11.30 *a.m.*—Pulse, 108; soft and small. Pupils natural. *At this hour* 20 *grains chloral given.*

11.50 *a.m.*—Pulse, 102; considerably improved. Has just fallen over. *Aspect entirely that of a person in deep natural sleep.* Snores. Hands are lying quietly on breast, and *only a rare twitch is observed.* Eyelid lifted, and *pupil* found to be *pin-hole.*

12.20 *p.m.*—Pulse, 104; good. *Sleep continues*, but is disturbed by slight muttering and subsultus.

12.50 *p.m.*—Pulse, 100. *Quietly and soundly asleep*, as at first. Passed urine copiously 5 minutes ago, having become very noisy and excited just before that, but falling quiet immediately after.

7.5 *p.m.*—Pulse, 100; pretty good. *Sleep continued until about* 2.30 *p.m. unbroken.* Has dosed and waked all afternoon.

17*th* (15*th day*) 2 *p.m.*—Pulse, 120. Has had *no sleep* all night. Nervous symptoms as bad as ever. *At this hour*, 20 *grains chloral given.*

2.20 *p.m.*—Pulse, 120. Respirations, 30. *Sleeping soundly*, and has done so for more than 5 minutes. *No subsultus.*

4.20 *p.m.*—Pulse, 124. *Still sound asleep.*

6.20 *p.m.*—Pulse, 124; but from subsultus difficult to count. Has slept and waked by turns during afternoon; but is now restless again.

Progressed favourably afterwards.—No recurrence.

In Case XIII., there was bronchitis and congestion of both lungs—a state of matters which forbids the use of opium—but chloral was given from time to time, producing sleep, without promoting pulmonary stasis. In Case XV., the restlessness of tubercular meningitis supervening on typhus, in an infant aged 18 months, was temporarily calmed by a dose of 2 grains. The general statistics of results in all cases are as follows:—Chloral was administered 32 times in the treatment of 21 cases. Of these 32 doses, 24 were followed by sound and well-marked sleep, lasting without interruption from 1 to 5 hours, and nearly always prolonged by a succeeding period of broken sleep and general tranquillity, 3 doses had a decidedly, 4, a partially soothing effect, and 1 proved inert; but this last dose was immediately vomited and ought not therefore to be counted. Looking to the 21 individual cases, we find that *not one proved insensible to the chloral when repeated.* I never met with an equal number of consecutive cases of delirium, &c., in which any other sedative showed such uniformity of action, or even approximated to it.

Comparative effects of chloral and other hypnotics.—In the treatment of fever one has necessarily an unusual opportunity of studying the effects of hypnotics and sedatives. Very few cases pass through the physician's hands without at some period demanding the use of some means of producing sleep artificially; and the question which to employ is neither unimportant nor easy of solution. I have a very decided opinion as to the danger attending the use of opiates in fever, no matter how guarded with eliminants, as antimony, grey powder, &c. Nothing astonishes me more, as being opposed to my whole experience of their disastrous results, than the free and unguarded way in which preparations of opium, either alone or combined, are recommended even in treatises on fever,* and employed by some practitioners. From the want of a better agent, I have hitherto, after Graves, used Battley with tartar-emetic (5 drops to $\frac{1}{12}$ grain), but I never order such a draught without apprehension, and have repeatedly seen patients put into a dangerous state of narcosis even by *one* such minute dose, a state always requiring active and prompt measures to save the life, and not unfrequently ending in fatal coma, or pulmonary engorgement or congestion. As is well-known, opium always cripples the eliminating functions, especially of the kidneys; and as antagonistic to this action, I always combine with it some diuretic. Even in health you cannot develop the narcotic action of opium without this effect on the excretions. The general action on the nervous and muscular tissues is also paralyzing. The bronchial muscles and epithelium, and the external muscles of respiration, share in the narcotic paralysis. Hence the invariable tendency in opium poisoning to stasis of the blood in the pulmonary vessels, and of the bronchial secretion in the bronchi. Suppose now a case of typhus in the second week, in a state of sleepless delirium from the circulation of poisoned blood through the brain. The cerebro-spinal nervous system manifests the results of its impaired nutrition by violent excitement, or low muttering insomnia; the muscles also, voluntary and involuntary, suffer changes of structure, which can be seen under the microscope; the external muscles of respiration are partially paralyzed, and stasis, set agoing in the lungs by the altered relation of the impure blood to the capillaries, is promoted by the imperfect expansion of the chest wall. The external and internal pathological conditions act and react on each other. When, therefore, we give an opiate to a typhus patient we combine two similar pathological tendencies, and may precipitate into narcosis functions which were previously on the brink, and by cautious management might have been preserved in some measure of vital activity. It is impossible to say what dose will *not* have this effect. As I have said, 5 drops of Battley and $\frac{1}{12}$ gr. of antim. tart. will do it. In rare cases I have seen even the slight lowering of vital action, which accompanies natural sleep (in this case, however, sleep coming without artificial aid to a blood-poisoned fever patient), develop in a case such as I have described, congestion of the lungs, general lividity, and partial coma. But, as a rule, in natural sleep there are no such dangers, and it is the almost perfect analogy between natural sleep and the sleep induced by chloral, in properly adjusted doses, which commends that drug to my mind as the best hypnotic in febrile diseases. I am well aware that the clinical experiments here recorded are but limited, and that my conclusions must be subjected to prolonged trial and observation before they can be thoroughly established. Still, I see in the chloral sleep something different from opium sleep, and both positive and negative properties in the former drug, which mark it as safer than the latter. 1. The action of the pupil to which I have already alluded illustrates excellently the close approximation to a natural sleep which chloral bestows, and the difference between it and opium in physiological effect. In all forms of sleep the pupil is contracted to the utmost. But, in natural sleep, the moment the sleeper is roused, and the eyes are opened, the pupil expands; while in an opium sleep the pupil remains contracted, it may be only for a few seconds, or for minutes, or hours. This illustrates in little the general condition of the nervous and muscular system in natural and chloral sleep, and in opium and other narcotic forms of sleep. As we have seen, the chloral sleeper may be roused at any time. He is at once in the full command of his functions, he may take food, pass urine, cough with full strength, expectorate, &c.; and whenever the temporary excitation ceases, he may drop over again into unconsciousness. Indeed, as a rule, the chloral sleep consists of a continuous initiatory stage, followed by a period which may extend over 6, 8, or more hours of sleep, interrupted by intervals in which food, &c., may be given without the necessity of waking the patient, or any risk of re-establishing the excitement. This was specially noted in some of our cases, as in Case VII, "8 p.m. Sleeping; had drinks at intervals, falling asleep at once afterwards." Not so with the patient after an opiate which will produce an equally sedative effect. His pupils are small; if his lungs are gorged with mucus, he has neither the intelligence to see the necessity, nor the muscular energy at command to cough and expectorate. 2. The excretions are not affected by chloral. They are by opium. The bowels are made costive, the urine scanty, the mouth parched, and the skin dry. 3. The administration of an opiate to a child is in any circumstances a procedure which the practitioner adopts with misgivings. Chloral may be given with perfect safety, and with perfect success. 4. Opiates, even as combined by Graves, with tartar emetic, are uncertain, very frequently quite futile. As already stated, I have met with no patient who resisted the action of chloral.

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* See *Reynold's System of Medicine*, Vol. I. Article on "Typhus Fever," by Dr Buchanan; p. 534. Also, even *Murchison* gives this questionable special indication for opium, "delirium approaching to typhomania or *delirium tremens*." (p. 276.) The dangers of opiates in fever are given with great clearness and good sense by Hudson. "*Lectures on Fever.*" (p. 376.)

I have contrasted chloral with opium at much length, because opium is really the only hypnotic of sufficient value to be contrasted with it. Having, in the course of practice, gradually acquired the opinions regarding its dangers in fever, to which I have already given strong expression, it was natural that I should employ any drug or method which promised good results as a sedative. Space forbids any lengthened reference to this partly experimental practice. For some time, the bromide of potassium and cold-sponging have almost entirely displaced Graves' mixture, and Battley and ether, which, for a long time, were my only sedatives. The bromide, formerly tried, but imperfectly, and thrown aside, was revived by Dr Tennent, at the request of the Professor of Materia Medica in the University, and has been extensively used. It is capricious, sometimes acting with excellent effect, but oftener proving useless in apparently similar circumstances. We give it in drachm doses, three times repeated, at intervals of an hour. It rarely acts, even when the best results ultimately follow, within forty-five minutes, or an hour. No dysphagia or other toxic effect has ever been observed, and its narcotic action manifests none of the dangerous tendencies of opium. Chloral, however, far excels the bromide in efficiency and certainty. In cases IV., VI., and VII., where chloral produced prolonged sleep, followed by no recurrence of delirium, it was appealed to after the bromide had failed. *Cold sponging*, again, soothes, by the abstraction of heat from the periphery, and is consequently useful only in the acute delirium and insomnia of the acme of fever, when the skin is pungently hot, and the condition such as I usually describe by the adjective "fiery." In these circumstances, sponging with iced water every 2 or 4 hours, has often a calmative effect. During the prolonged course of Case V., various sedatives were used. The following notes will show their comparative action. The effects of the bromide, though not so rapidly produced, were quite as good as those of the chloral in this case.

Case V.—Elizabeth H——, aged 30. A case of severe typhus, with prominent cerebral symptoms throughout, which ultimately outlasted the

fever, and passed into *acute mania;* the second case of the kind I have seen after typhus. Both cases went on, unchecked by treatment, to a *fatal termination.* The following sedative agents were employed from time to time in the present case.

1. Tartar emetic, $\frac{1}{12}$ grain; Battley, 5 drops; once, no effect; and once, half hour's sleep.
2. Tartar emetic, $\frac{1}{12}$ grain; tinct. digitalis, 5 drops; every 4 hours. No effect.
3. Bromide of potassium, in drachm doses, repeated for three successive hours. Given on 4 occasions, with excellent effect on three, but no effect on one.
4. Battley, 10 drops; chloric ether, 20 drops. No effect.
5. Blister to scalp; twice. No effect.

Dec. 21*st.*—Pulse, 124. Wild delirium for at least 24 hours. At 2.30 *p.m.*, 20 *grains of chloral given.*

3 *p.m.*—Pulse, 116; soft. *Sleeping soundly and naturally; fell asleep in* 5 *minutes after administration.*

4 *p.m.*—Pulse, 108. Continues in same placid sleep.

5 *p.m.*—Pulse, 100; soft. Sleeping soundly.

6 *p.m.*—Pulse, 132; feeble. Just wakened, and as *maniacal as ever.*

Dose of chloral. Mode of administration. Dangers.—My first cases proved conclusively, that for the class of patients under my care, 40 grains is a toxic dose. It produced depression and irregularity of the heart's action. In my cases, all the benefits without the dangers of chloral were obtained with 20 grain doses for adults; 2 grains for an infant of 18 months; 3 grains for two of 3 years; 10 grains for children of 9 and 14 years. The drug was given in an ounce of water sweetened with half an ounce of syrup.* Children take the draught quite readily in this way, and like it. If not sufficiently diluted, the medicine is vomited, as in Case I., where 30 grains were dissolved in only half-an-ounce of water and syrup. When sufficiently diluted it may be borne by the most irritable stomach, as it was in Case X., in which nutrient enemata were required from obstinate vomiting, and yet the chloral was not rejected. The dangers of an over dose of chloral are manifest from the cases in which 40 grains were administered. The depressing action of chloral on the cardiac ganglia is then developed. For the sake of the purity of the experiment, in some of my cases, all stimulants, and to some extent even food, were prohibited. This is, however, unnecessary, especially in view of the readiness with which the chloral, like the natural sleep, may be broken and resumed. Indeed, the same rule applies here as to all the circumstances of a fever patient,—not to interrupt the regular administration of food for any cause, and remembering that we are dealing with a drug which has a special action on the heart, we should first be cautious in adapting the dose to the age and vigour of the patient; and then, having given it, should watch the pulse at intervals, more particularly during the next six hours.

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* This dilution is enough for the lessened sensibility of a fever patient, but, from personal trial, *not for ordinary use.*

The mode of action of chloral.—This theoretical question assumes some practical importance when we employ chloral in typhus. According to Liebreich, the ultimate physiological action is not that of chloral, but of chloroform produced by the decomposition of chloral by the alkalis of the blood. This theory is strongly supported by the fact that chloral mixed with fresh blood does evolve chloroform. M. Personne and Dr Richardson agree with Liebreich. Indeed M. Personne has gone further in the proof of the theory by demonstrating the presence of *chloroform in the blood* of dogs, to whom *chloral alone* had been administered.* Now it is well known that the tendency of the typhus process, as it advances, is to *increase the alkalinity* of the fluids of the body. Ammonia can be detected in all the excretions in an amount much greater than in health. The urine, at the close of a severe case, gives off free ammonia so copiously as to cause lachrymation, and to be sometimes quite unbearable by one auscultating the back, for example, of a patient passing it involuntarily. "There is good reason for believing," says Murchison, "that the unnatural fluid state [of the blood] in typhus results from an abnormal amount of ammonia." Whatever may be the precise pathological product, there is no doubt of the fact that typhus blood is more highly alkaline than the blood in health. Hence, if its action depends upon alkalinity at all, and M. Personne seems to have demonstrated that fact, then chloral must be *par excellence*, the hypnotic suited for typhus. Liebreich's theory is in itself beautiful and attractive, and in the words of a recent reviewer, "it is impossible not to feel a genuine admiration for the stroke of genius which is indicated in the prediction, from purely chemical considerations, that chloral would yield up chloroform to the blood in precisely the form in which it might be expected to do the maximum of good and the minimum of mischief." The illustration of the theory furnished by the rapid and magical effects of chloral in typhus involves an idea even more attractive. We transform a pathological into a therapeutic process. The fever-products liberate the soothing agent, and so calm the excitement which they themselves have made.

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* *Gaz. Hebd.*, November 19th, 1869.

The subject of special susceptibility in typhus patients to the influence of chloral, in reference to the theory of its action, is one which must be reserved for future investigation. But it is entirely confirmatory of my supposition to find that there is such a susceptibility. The chemical conditions on which, according to Liebreich, the physiological action of chloral depends, exist in typhus in excess. The physiological effects of chloral ought therefore to be developed in a typhus patient with smaller doses and with greater rapidity. My experiments are few, but they are all *positive in their result.* Liebreich states that *the nervous power of the heart is the last which suffers.* Richardson says—"In fatal cases the functions destroyed are: 1. The cerebral. 2. The voluntary muscular. 3. The respiratory. 4. *The heart.*" In my observation on *physiological action,* it will be seen that a dose so small as 40 grains in two out of three cases, proved toxic to the extent of developing the ultimate of the series of functional effects—that upon the heart; and that in one case even 20 grains seemed to produce this result, while the whole series of cases illustrates the striking facility with which small doses produce the primary effect on the brain and voluntary muscles, and sometimes lowers the frequency of the pulsations.

IX.—REPORT OF A COMMITTEE OF THE MEDICO-CHIRURGICAL SOCIETY OF GLASGOW ON THE BRAIN OF AN APHASIC.*

(*Read to the Society*, *7th January*, 1870.)

THE Reporters regret that so long delay has intervened between the remit from the Society and the presentation of this Report, but they are glad to state that the examination of the specimen submitted to them has yielded points of very great interest.

The details of the case, as described by Dr Robertson, will be in the recollection of many members. The main facts which it is important at present to recall, are that hemiplegia of the right side and aphasia co-existed with fair intelligence, which remained unimpaired to the close of life. Dr Young much regrets that a misunderstanding as to the time that the preparation had been in spirits led to its being left too long in one position while still soft. Distortion has resulted, but fortunately this distortion has not affected the points of chief interest.

The first glance shows a remarkable difference in dimension between the two halves of the cerebrum, the cerebellum being symmetrical. To one of us it appeared as if the number and complexity of the convolutions was greater on the right than on the left (the affected) side, but as there did not seem to be conclusive evidence that the disparity exceeded the limit of variation in normal brains, the point is not urged,—is, however, noted with a view to future research when opportunity offers.

It is at once evident that the left half of the cerebrum is not equally diminished in size, that in fact the posterior halves,—that is, all lying behind the fissure of Rolando on both sides,—were nearly equal. Measurements were made of the maximum length from the posterior lobe to the anterior point of the marginal convolution. The results were :—

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* The committee consisted of Profs. John Young, M.D., W. T. Gairdner, M.D., Drs Thomas Reid and Alexander Robertson.

N.B.—Two plates of the brain are in preparation, but, in going to press, we learn that, owing to the illness of the artist, they may not be ready in time, in which case they will appear with our May number. —*Ed. Com.*

Right side, 6 inches. Left, 5½.

The dimensions taken from the posterior lobe to the anterior end of the temporal lobe were :—

Right side, 5 inches. Left, 4⅞.

The difference, therefore, is almost entirely confined to the anterior lobes.

The lesion to which attention was chiefly directed lay in this anterior part of the brain. Cerebral matter was absent over an area about 1 inch wide, and 2½ inches long. There remained only a highly vascular surface, seemingly composed chiefly of the membranes of the brain. Nor was the deficiency apparent only on the upper surface, on the lower surface the cyst-like structure was visible as far back as the root of the olfactory lobes.

Of the total loss of substance, some idea may be formed from the following measurements :—

Right.—Greatest distance from superior frontal marginal convolution and fissure of Sylvius, 2¾ inches.

Left.—Greatest distance from superior frontal marginal convolution and atrophied margin of that fissure, 1¾ inches.

Right.—From the same point to margin of superior temporo sphenoidal fissure, 3 inches.

Left.—From the same point to margin of superior temporo sphenoidal fissure, 2 inches.

On comparing the corresponding portions of the superior frontal convolution, the dimensions were :—

Right, 1⅛ inch.
Left, $\frac{5}{8}$—$\frac{6}{8}$ of an inch.

The boundaries of this space were :—

Commencing below, on the median side, the marginal convolution continuous above with the superior frontal convolution, or that which forms the lateral boundary of the median fissure. Neither superiorly nor inferiorly did any recognisable convolution exist, the cyst passing into the horizontal fissure of Sylvius, whose outer boundary, the superior temporo-sphenoidal convolution limited the lesion in this direction.

Posteriorly much difficulty was experienced in determining the corresponding parts of opposite sides; but it is now clear that the atrophy ceases with the parietal lobes of Gratiolet, which lie behind the intraparietal fissure. Thus, the parts to which the lesion has extended are the ascending parietal, the ascending frontal, the middle frontal, the external frontal, and the central lobe or Island of Reil. But these are not all equally affected: thus, while the whole of the external frontal has disappeared, a small part of the middle frontal remains at the upper part of the space close to the marginal convolution. The ascending frontal is represented by a small quantity of cerebral matter at its upper end; of the ascending parietal a small quantity of cerebral matter survives at its lower end; of its upper termination about an inch is distinct. Thus, a small part only of the fissure of Rolando is left for comparison. The peculiarly sharp definition of the defective area is, however, more apparent than real. Thus, proceeding from the normal convolution of the posterior half of the hemisphere, the first sign of change is met with in the parietal lobes of Gratiolet. These lobes are part of the superior temporo-sphenoidal convolution of Turner, or that convolution which forms the outer boundary of the Sylvian fissure. This fold passes backwards, and at the end of the posterior part of the fissure, comes into relation with the parietal folds, the two thus forming a curve round the fissure. It is this arrangement which we selected as the standard of comparison of the two sides. Now, the parietal convolutions, though distinct, are narrower and smaller on the left than the right side. They have, in fact, undergone atrophy, their substance diminishing forward till the subordinate folds passing from them to the ascending parietal, and only visible because the absence of these latter permits the floor of the sulcus to be seen, thin away, and are lost in the wall of the cyst. The passage is, then, gradual from normal form to the extreme pathological state. But it is at the same time to be noted at this point, as at all other points on the limits of the cyst where convolutions gradually thin out, that the membranes may be readily stript off the convolutions very close to the cyst. The membranes become adherent to each other, and then to the surface of the convolutions; but the substance of the convolutions diminishes till at last the wall of the cyst is composed only of the membranes, with abundant vessels ramifying in them. The nature of this relation was best seen in studying the Island of Reil. Of that triangle the apex only is recognisable, or that portion by which it is connected at the bottom of the Sylvian fissure with the temporo-sphenoidal convolution; and even here it has been slightly torn in the removal of the membranes, which already at this point have become adherent. The Island is, in fact, lost in the cyst.

On the under surface of the brain the lesion has necessitated an interesting re-arrangement of parts. The supra-orbital lobe being destroyed, and the outer side of the olfactory groove gone, the olfactory bulb lies on a different (in the natural position of the brain, a higher) level than on the right side. So the left optic nerve.

The cerebellum was then removed by an incision carried through the crura close to the pons Varolii. The first appearance remarked was a patch of grey degeneration in the left crus. The darkest portion of this patch lay nearer to the middle line than the customary position of the locus niger; backwards and outwards a greyer tint passed into the colour of the crus. It was next remarked that the two crura were of unequal size—the right crus, measured from middle, having extreme length $\frac{23}{34}$, the left $\frac{41}{48}$ of an inch; their proportions being fairly rendered in the accompanying sketch by Dr Thomson. Moreover, the corpora albicantia were seen to share in the asymmetry, that of the left side being smaller, and situated farther back than its fellow, this retraction (so to speak) being consequent on the diminished bulk of the crus. The optic tracts were symmetrical, but the left corpus geniculatum had suffered diminution of bulk, as also the left pair of the corpora quadrigemina. Still more important was it to find that the two halves of the pons also differed, the left again being the smaller. The medulla oblongata had in removal been cut rather short, and had shared in the distortion whose occurrence has already been regretted. A careful transverse section was made below the olivary bodies so as to exhibit a fresh surface, when it was found that the *right* side was now the smaller. The section had, in fact, been made through the decussation.

Of the cerebral vessels little requires to be noted. They seemed natural; no proof of occlusion could be detected. In fact, the only remark called for is that the branches of the middle cerebral were more numerous than usual, ramifying in the walls of the cyst. In the removal of the membranes, a small part of the choroid was withdrawn from its place, but it, too, seemed natural. No degeneration was noted in the walls of the arteries.

Atrophy of parts behind the seat of a cerebral lesion, or, to speak more precisely, in the track of the downward fibres from such a lesion, is already familiar; an atrophy which reaches its extreme in the wasting of a paralyzed limb. But the reporters would draw particular attention to the occurrence of a second lesion, that in the crus. Such a lesion met with apart from the aphasic condition and uncomplicated by the loss of cerebral substance, so remarkable in this case, would have been deemed sufficient to account for the diminished bulk of the right half of the cord.

It only remains to add that Dr. Allen Thomson, at the request of the reporters, carefully examined the preparation; and, in acknowledging his valuable aid, his opinion must be quoted in explanation of the fact that the ventricles have not been examined, that the depth of the lesion has not been ascertained. The investigation of the pathology of Aphasia is still young: each case presents new points. The interesting topography above described has been decided without injury to the external appearance of the hemispheres. The preparation of exact figures of the undisturbed parts seemed therefore, a first duty; then the necessary sections could be made, Dr. Thomson having suggested that they might with care be practised without destroying the external appearance of the hemisphere. J. Y.

NOTE OF CASE BY DR ROBERTSON.

The patient, whose brain is the subject of the preceding report, was aphasic for upwards of twenty-two years. The disease followed an apoplectic seizure. Her friends stated that for some weeks after its commencement there was almost entire unconsciousness, and that the accompanying palsy of the right side was complete. Her condition had slowly improved, but appears to have remained stationary after a year or two. She came under my care in the Town's Hospital about four years before her death. At intervals her mental condition was subjected to repeated careful observations, and the results of these are detailed in my paper on the Pathology of Aphasia, in the *Journal of Mental Science* for January, 1867, (case, Mary Kelly.) It must here suffice to say that she could not utter above four or five monosyllabic words, but these were articulated with perfect accuracy. Her intelligence was good, her conduct was correct, and she made herself generally useful in the ward. The right arm was contracted and wasted; the corresponding leg was less affected, though she dragged it very obviously in walking. So far as I could observe, there was not the least change in her mental condition till death, or rather the unconsciousness which preceded it for a few hours. The fatal illness lasted about six weeks. Its prominent symptoms were severe pain in the region of the stomach, with very frequent vomiting, resulting in progressive enfeeblement and ultimate exhaustion.

At the *post mortem* examination the thoracic and abdominal organs were found healthy, except the kidneys, which were large and flabby, and to some, but not a great, extent, had undergone fatty degeneration. A. R.

X.—HYDROCYANIC ACID PHYSIOLOGICALLY INVESTIGATED.

PART II.

From the German of DR PREYER, *Bonn.*[*]

THE first part of this work, of which an abstract is already before our readers,[†] consisted entirely of an account of the author's experiments, instituted for the purpose of elucidating the effect of prussic acid upon the heart and upon respiration. In this second part a very complete resumé is given of the result of previous investigations, accompanied, where necessary, with a criticism of the methods and arguments, supported occasionally by direct experiments, details of which are given. According to our promise (Vol. I., p. 81), we shall now give a short summary of the contents of this part.

If a poison be defined as a substance which, when introduced into a living organism, undergoes chemical change, and thereby disturbs the health of the organism, the aim of toxicology will be to answer the two questions:—(1st), What happens to the poison from the moment in which it is introduced into the living body? and (2nd), What deviations from its normal condition does the poisoned organism exhibit? For no one poison are these questions answered completely, and only for a very few has an answer been attempted. For prussic acid, it seems in the meantime impossible to answer the first question, because the quantity which can act is so very minute. The second, however, though still difficult, requires merely methodic poisoning and observation. As accurate results can be obtained only by repeated experiment and comparison, the author gives a review, under twelve different heads in a table, of upwards of 300 experiments made during the last sixty years, with different animals, by different toxicologists. Their results, however, are deprived of most of their value by the absence of strict quantitative measurements. Thus, in the simple matter of the amount administered, though the actual quantity given is stated, yet the experimenter has left undetermined the strength of the acid used. When it is remembered that there are some twenty different strengths, varying from Gay-Lussac's absolute acid of 100 per cent., down to the British, American, and Prussian officinal acid of 2 per cent., the necessity of stating the strength, as well as the quantity of solution, will be apparent. Another difficult point to determine is the duration of the poisoning, especially when the animal recovers. The effect is so rapid, and the different stages follow each other so closely, that very frequently the last expiration of the animal has been identified with its death, though it cannot be said, unconditionally, at what period in prussic acid poisoning death, in the strict sense of the term, occurs. (p. 5.)

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[*] "Die Blausäure. Physiologisch untersucht." Part II. pp. 174, 8vo.; Bonn. 1870. The author has kindly sent an early copy of the work.—Ed. Com.

[†] *Glasgow Medical Journal.* New Series. Vol. I. Pp. 70–81. 1868.

A review of 249 of these experiments shows that 12 mammalia, 19 birds, 2 reptiles, 4 amphibia, and 2 fishes have been operated on. The poison was administered in various ways; the solution was poured into the ear, upon the eye, into the nose, upon the tongue, &c., upon the skin; and it was given with food, or it was inhaled as vapour. It was also injected under the skin, into the carotid artery and jugular vein; into the abdominal and pulmonary cavities; upon the brain, heart, medulla oblongata, and other organs; in all, 28 different applications. It is observed here, that when a nerve is laid bare, cut, and the ends dipt in prussic acid, no symptoms of poisoning are evinced, as has been shown by several physiologists; nor when the poison is laid upon an extremity, the blood-vessels of which have been bound; nor if it be applied to the dura mater or brain substance; nor if a lethal dose be subcutaneously injected, provided the vagus be cut on both sides, or artificial respiration has been raised to a state of apnœa. [Blood containing too much oxygen.] The 28 *modes of application*, however, are reduced to 2, when the operation of the poison is considered; because it acts either generally by absorption into the blood, or locally at the place of contact. The poison thus finds its way into the blood (*a*) by the lungs; (*b*) by injection into the blood-vessels, &c.; (*c*) by absorption from a surface such as that of the vagina, ear, &c. It is fatal locally when administered (*a*) to the exposed heart; (*b*) to the exposed lung; (*c*) to the medulla oblongata. In several cases, however, the poison may act in both ways. With regard to the *rapidity of action*, according to the place of application, it is found that injection upon the medulla oblongata produces the effect in the shortest time, while injection into the ear, or into open bleeding wounds, takes much longer, and injection into the vagina longest of all. Doubt exists as to the possibility of the poison acting through perfectly sound skin.

A good deal depends upon *the rate of administration*, whether a quantity of the acid will produce the symptoms; and this applies both to the gas and to the solution. If a fatal dose of the latter be administered in successive small drops, allowing a certain time between them, no effect may be produced. The same thing happens, also, if the gaseous acid be inhaled, mixed with a sufficient quantity of air. The effect of the dilution in this case, however, is different from the dilution of the fluid acid with water. A fatal dose of acid is still fatal, though abundantly diluted with water, provided only it be taken all at once. This condition cannot be so easily fulfilled with a fatal dose of the gas mixed with air.

Of all animals, those most easily affected are birds; those least affected are amphibia and fishes, and this whether the quantity of acid or time in which it operates be considered. A measure, therefore, of the *sensibility of classes of animals* to prussic acid is found in their temperature, of which this table gives the expression:—

1. Birds.—Most rapid tissue-change—Aerial animals.
2. Mammalia.—Rapid tissue-change—Air and earth animals.
3. Reptilia.—Slow tissue-change—Earth animals.
4. Amphibia.—Slower tissue-change—Earth and water animals.
5. Fishes.—Slowest tissue-change—Water animals.

Less definite results have been obtained for invertebrate animals. Snails and worms are not so easily killed as crabs. Insects are very readily killed; spiders less easily than others. The general result, however, is, that all these animals are killed by prussic acid, with a facility which is astonishing, compared with that of other poisons. It seems undoubted that, however the poisonous nature of prussic acid be explained, it paralyses the nervous centres of animals which have them, while it destroys those without nerves, probably by neutralising the ability to absorb oxygen. The immunity said to be enjoyed by some animals, for example the hedgehog, against prussic acid, does not rest upon sufficient evidence. Dr Preyer made special experiments with hedgehogs, and found them as susceptible to the poison as any other animal. The largest animal which has been operated on is the elephant—but the details are not full. It belonged to a menagerie, and, having become wild, was poisoned, in 1838, at Potsdam—an ounce of the acid (if officinal, then 0·6 grm. HCN) was given in rum. After sucking it up, it spirted it out again; it then began to tremble, and in a quarter of an hour it was dead.

Very conflicting statements are found with regard to the *influence of age upon susceptibility.* No general deduction from the experiments can be drawn, because different animals exhibit quite different relations to the acid. Young dogs, rabbits, and guinea-pigs have much less severe tetanic spasms than older animals, whereas very young insects are more easily killed than older insects. With regard to their physiological and pathological state, weak, starved, or diseased animals are poisoned more quickly than strong, well-fed, healthy animals. The psychical state, also, of the animal is not without influence; for, if it is alarmed or excited, the effects of the poison are complicated with those arising from the psychical disturbance. Animals which are hungry at the time of the experiment are more easily killed than if they had been fed; some birds require larger doses at night than in the morning; and hybernating animals are less susceptible in winter than in summer to the acid. Hardly any observations have been made on the difference exhibited by the sexes. The most striking fact is, that rabbits which have had large and fatal doses injected into the vagina have hardly shown the slightest symptoms of poisoning. But this exhibits rather the very slow absorption by the mucous membrane than indicates an immunity on the part of the animal. If the animal happens to be pregnant, the fœtus may retain life after the mother is dead, but abortion may be caused by the cramps which the poison produces.

Reference has already been made to *the time which elapses between the administration and the visible effects of the poison,* and to the necessity of arbitrarily fixing upon some definite symptoms to mark the beginning and end of the operation. If the beginning be taken at the moment the animal falls, different results are got, according to the application and concentration of the acid, and the species of animal. Thus, 0·027 grm. injected into a vein in the thigh killed a horse in 1 minute; 0·63 grm. into the jugular vein, in 21 minutes; 0·069 grm. into a vein in the nape of the neck, in 32 minutes. With a rabbit, 3·7 grm. in the mouth produced death in 1 second; 0·006 grm. in the jugular vein, in 20 to 30 seconds; 0·02 grm. in the mouth, in 2 minutes; 0·038 grm. in the abdominal cavity, in 6 minutes. While these numbers show the rapidity and certainty of the action of the acid, they also show that the time is a function of the amount of the acid which reaches the blood. It diminishes in some unknown ratio with the increase of this quantity. The statement, therefore, that rabbits poisoned with enormous quantities die at once is probably exaggerated.

The author himself undertook certain *experiments with absolute acid,* which, of all poisons, is the most rapid in its action upon warm-blooded animals. As very few have used this substance at all, and the results are vague, it was desirable to see the rate at which it acts. Great precautions were necessary, both in making, and still more in administering such a dangerous substance. The acid was made in Kekule's laboratory, and it was known to be absolute by its freezing when allowed to evaporate. The experiments were conducted in a room freely open to the air. The bottle from which the acid was taken was kept in ice in a chamber with a strong draught; and the greatest care was exercised not to inhale the smallest quantity of acid or to expose the hands unnecessarily to it. This acid was administered to guinea-pigs, rabbits, and frogs, both by inhalation, by contact with the nostrils and ears, and by subcutaneous injection. The results observed were—1st, That inhalation for one second, of the strongest acid mingled with some air, killed guinea-pigs; and for 3 seconds, rabbits. 2nd, The time from the first introduction of the acid into the animal to the end varied from 5 to 16 seconds with guinea-pigs; from 15 to 29 seconds with rabbits. 3rd, The quantity of acid that killed these animals is so small that it can hardy be determined.

An experiment was made to find *in how short a time respiration and the heart's action could be stopped entirely.* One cubic centimetre of 60 p.c. acid, was injected into the jugular vein of a rabbit. In 29 seconds the cramps began, and in 10 seconds more they ended suddenly, and the rabbit lay absolutely motionless. After 22 seconds there was a single ineffectual inspiratory twitch. In this case the blood was not dark coloured, but looked far more arterial than venous. Death then was produced by paralysis of the heart, and that so rapidly that the oxyhæmoglobin was not consumed, or at least not so quickly as other authors have said.

The general characteristics of prussic acid poisoning depend partly on whether or not the case ends fatally, and if the latter, whether it is quick or slow. In the former, the stages are counted by seconds or minutes; in the latter, by minutes or hours. Some animals can be poisoned in both ways, but others, such as cold-blooded vertebrates, only exhibit slow poisoning. The stages are as follows:—

1. Difficulty of breathing, diminished heart-rate, full pulse, giddiness, tottering, and then the animal falls.

2. Violent cramps, enlargement of the pupil, loss of consciousness, frequently a cry, vomiting, tetanus, during which the heart and respiration cease, loss of motion, convulsions stop.

3. Collapse, general relaxation of the muscles, sensibility diminished or destroyed, occasional inspiratory twiches, pulse feeble and irregular, irritation sometimes induces tetanus, which is not survived; but death commonly occurs without cramps. For several hours the eyes retain a peculiar lustre, like that after poisoning by carbonic oxide.

The only essential difference between quick and slow fatal poisoning is, that the different phenomena occur at longer intervals. The stages remain the same.

When the animal recovers, the breathing becomes freer, more regular, and more frequent. The conjunctiva reacts and the pupil contracts. The animal begins to move its head and fore limbs. Spasms may intervene, but gradually it raises itself up, and after some time begins to eat, and finally not a trace of the action remains. There is no difference in the three stages in such cases; the only difference is in the result, recovery instead of death. The convulsions and some other symptoms are not shown by all animals, but defecation and urination are extremely common with all.

The *diagnosis* of prussic acid poisoning is generally easy from the odour of the breath. Only three substances possess it, prussic acid itself, nitrobenzol, and bitter almond oil. The latter is too expensive, and requires too large a dose, to be commonly used as a poison. Nitrobenzol is very poisonous, but its symptoms, so far as they are known, differ from those of prussic acid; its odour, too, is much more powerful.

The *prognosis* is unfavourable the acuter the course is; the reverse if the symptoms are slow and diminish. An apparently reliable sign of recovery is an increase in the frequency of breathing in the comatose state. If it reaches above the normal, recovery is certain.

What chemical change the acid undergoes in the body is not known, and the author, who intended to investigate the subject, has been compelled, in the interest of health, to intermit his further study of this substance.

The body of an animal, after poisoning with the acid, discloses no action of any kind peculiar to it, except in those rare cases where highly concentrated acid has been used, and then the place touched by the acid may be somewhat affected. Dropped, for instance, on the cornea, it produces a white scurf, or it reddens the mucous membrane of the mouth, and it coagulates the blood and partly decomposes the corpuscles. None of these, however, warrant the conclusion that prussic acid is present. The body, in fact, shows the same appearance as when life has been destroyed by suffocation in nitrogen or hydrogen. Even when the blood is red, in consequence of paralysis of the heart, prussic acid cannot be said to have been in operation, because the same effect is brought about by other causes, and it is often absent in prussic acid cases. The red colour generally disappears in from 12 to 24 hours after death, both in hot and cold-blooded animals.

The investigation of the *action of prussic acid upon separate organs* is of great importance, but the recorded statements do not always agree with each other. Some say that the blood in all the vessels is extraordinarily dark; others that it is black, thick, like pitch, that it does not coagulate, or is completely decomposed. Others have found it brighter red than usual, and have based an explanation of the action upon this appearance. In fact, both conditions exist, depending on the amount of poison administered, and the rapidity with which it takes effect. That the venous blood becomes brighter has been repeatedly observed, but as this can be induced by other causes which disturb respiration, it cannot be regarded as peculiar to the disturbance caused by prussic acid. It may be due partly to a suddenly produced apnœa, or to hyperæmia caused by increased pressure in the arterial system, though it is not so easy to find what gives rise to the increase of pressure, whether contraction of the vessels, or more powerful action of the heart. This, however, does not account for the constant bright red blood of cold-blooded animals poisoned with the acid. Microscopic examination showed that the blood-corpuscles were nearly all dissolved when the blood was allowed to absorb the weak gas. There is formed, besides, a crystalline substance not distinguishable from hæmoglobin, and which is most probably the compound of that substance with hydrocyanic acid. The author does not explain how the bright yellowish-red colour of a frog's blood depends upon the formation of these crystals. The action of the acid upon the substance of the heart, organs of respiration, nervus vagus, eye, and bladder, has not been minutely or specially investigated. A separate section (pp. 97–107) is devoted to the *effect of the acid upon man*, with a review of cases, both of recovery and death. In all of these the ordinary stages may be observed. Those who recover all speak of the difficulty experienced in breathing. The author mentions that during the two years through which his experiments have extended, his susceptibility to hydric cyanide has so increased, that inhalation of the very dilute gas causes violent irritation of the gums, and continued headache, while continuous respiration of it produces undefinable pain in the breast. Some chemists have said that they are unaffected by prussic acid, but others agree with Dr Preyer.

With regard to the *therapeutic virtues* of prussic acid, the author says:—Neither as an emetic, nor as a specific against any disease whatever, can it be recommended. It is not suitable for diminishing either the pulse or the respiration, because this effect is produced with certainty by doses which in man act prejudicially upon the brain, or even threaten life. Nor can he approve of its employment as an antiphlogistic, as proposed by Hoppe-Seyler.

In Part I. a detailed account was given of the use of *sulphate of atropine as a rational antidote* to this poison. All the other antidotes hitherto proposed, such as eau de cologne, olive oil, Dippel's oil, milk, opiates, alkalies, ferrous sulphate, magnesia, either are without effect, or do not interfere in the least with the acid which has been inhaled. Quite as ineffectual are alcohol, albumen, ammonia, chlorine, coffee, and turpentine, all of which have had their advocates.

The *other rational antidotes* besides atropine are irritants, including cold affusion, venesection, artificial respiration, and the stomach pump, or emetics. Several experimenters have tried artificial respiration, but the results do not agree as well as could be wished. There is a vagueness, also, in the methods, which diminishes the worth of the results. From trials made by himself, however, the author can only reiterate the recommendation of Pereria, who says, that "artificial respiration should never be omitted."

General directions how a physician should proceed in any case of prussic acid poisoning cannot easily be given, so much depends upon the stage reached. The stomach pump is of use only at the very beginning, but emetics should always be administered if the acid has been swallowed. In every case, so long as respiration continues, small quantities of atropine should be subcutaneously injected. In the comatose stage, cold affusions on the neck or back, ice bandages on the head, bleeding if there is plethora, friction with warm cloths are recommended; but chemical irritants, such as chlorine or ammonia, are of little use. The best therapeutic aid, however, is rendered, after all others have failed, by artificial respiration, provided only the heart still beats. It makes no difference how the poison has been taken. Air may be passed from mouth to mouth with intermittent compression of the chest, and with motion of the body in a horizontal position from side to side, as is done in alcoholic poisoning. The heart should be closely observed all the time, and if its action become weaker, then tracheotomy should be no longer delayed, and air, which must be moist and warm, should be passed into the lungs by bellows.

The detection of prussic acid in the stomach or intestines is well known and comparatively easy. It is otherwise with the detection of inhaled hydrocyanic acid in the blood. The most recent investigations on the subject are by the late M. Schönbein, and they have furnished two of the most characteristic and by far the most delicate tests for hydrocyanic acid. The first depends upon the catalytic action of blood containing the acid upon peroxide of hydrogen, with the production of a dark brown colour. A mixture of blood and water, containing 0·000125 per cent. of anhydrous acid, was distinctly browned by the peroxide, while the acid alone, and the blood alone, were not coloured. Schönbein therefore proposed blood corpuscles and hydric peroxide as a delicate test of the presence of prussic acid. But as blood corpuscles are very readily darkened in colour by other substances, Schönbein tried to ascertain whether the dark brown prussic acid fluid had a peculiar absorption spectrum, and this he found from Hagenbach is the case. It gives an absorption band stretching over the greater part of the field except the red. Oxyhæmoglobin bands are no longer visible, and by the absence of the absorption lines in the red, the spectrum is easily distinguished from that of the sulphuretted hydrogen compound.

The most delicate reagent of all, however, was proposed by Schönbein in 1868, a mixture, namely, of tincture of guaiacum and sulphate of copper. With this most delicate reagent, Schönbein detects $\frac{1}{120,000,000}$ of the acid in a mixture; and Buchner shows the existence of cyanides in tobacco smoke; saliva gives the reaction most distinctly. The reagent consists of a dilute alcoholic solution of guaiacum resin, mixed with so dilute a solution of copper sulphate that there is no turbidity. It has a yellowish tint, but when the stopper of a bottle containing very weak prussic acid is held above the liquid, at a distance of 1 or 2 centimetres, a blue colour soon appears in the fluid, and blue veins begin to streak it in all directions.*

In applying this test to the detection of prussic acid in the blood of poisoned animals, it was interesting to compare the delicacy of it with that of hydric peroxide. The author accordingly made comparative experiments with the blood of newly killed rabbits, which was put into a retort and distilled gently with sulphuric acid; the distillate being collected in receivers which contained the two reagents. It was then found that the guaiacum and copper gave the blue colour distinctly, while the hydric peroxide and blood exhibited no brown tint. The superior delicacy of the guaiacum and copper seems from these and other experiments to be certain. It is not necessary for this reaction that the tincture be freshly prepared. It is one of the most important reagents of the judicial chemist, for, by its means, the detection of the acid is rendered possible when other reagents fail. This is of importance when the examination does not take place till some time after death; if a man is poisoned by the acid alone, it is impossible for the acid to escape detection if the body be examined immediately after death. The question still remains unanswered with precision whether prussic acid may not exist in the body as a product of disease or of decomposition. Since saliva is the only substance which gives the prussic acid reaction,† it must be concluded that, if the acid be surely detected in any other part of an exhumed body, it has been introduced from without, and raises the suspicion of poisoning, as much as if it had been obtained from the still warm corpse.

Other tests for hydric cyanide have been recently proposed; that of Henry and Humbert depends upon the decomposition with heat of cyanide of silver by iodine or bromine, whereupon crystals of bromide or iodide of cyanogen sublime upon the cool part of the tube.

Braun's test consists in adding to a mixture of cyanide of potassium, and chloride of cobalt, caustic soda to strongly alkaline reaction, and shaking up with air. In a few seconds the solution becomes brown. An alkaline solution of the tartrate of cobalt and sodium gives a strong yellow colour, with even a trace of prussic acid. The same chemist recommends picrate of potassium; when added to the acid and boiled the solution becomes dark red. The older Prussian blue and sulphide of ammonium tests have been recently re-examined as to their delicacy. For the gas, nitrate of silver is the most delicate, for the fluid, sulphide of ammonium. The Prussian blue test is more delicate for the fluid acid than nitrate of silver. The length of time during which prussic acid can be detected in bodies varies greatly, according to the dose, and the temperature of the surrounding medium. It has been detected after 3, 5, 7, 8, and even 21 days, but 8 days seem to be the usual limit.

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* Lebaigne has since showed that the blue colour can be elicited by various oxidizing agents, so that in testing, attention must be paid to the possible presence of such substances.

† Leared has since proved the existence of sulphocyanogen in the blood and urine. *Royal Society's Proceedings*, Vol. XVIII., p. 16. J. F.

The odour of bitter almonds emitted by the blood, which was formerly so highly prized as a test of prussic acid, is now known to be deceptive. The author relates a case of suicide in which the bitter almond odour was most perceptible, and was ascribed to prussic acid. Not quite satisfied, he mixed some of the blood, which was very dark, with water, which gave it a bright red colour, and then with peroxide of hydrogen. Oxygen was evolved in abundance, and the blood retained its bright red colour. Not a trace of prussic acid could be detected, but further examination showed that the poison employed was nitrobenzol, one of the substances already enumerated as possessing the smell of bitter almonds.

The author concludes this complete and valuble monograph with a series of 161 propositions, which give in a condensed form all the best-established facts and most important views elicited by his labours on this difficult question. This is followed by the bibliography of the subject in chronological arrangement. It contains, of course, only those writings which refer to the physiological action of the poison, from the dissertation of Schaub upon laurel water, published in 1802, and Schrader's paper in 1803, down to the time of publication of the present treatise. In taking leave of Dr Preyer's work, we commend it to the attention of toxicologists who feel the importance of having the knowledge of their facts systematized by a rational explanation, based upon reliable experiments and accurate quantitative determinations. J. F.

Reviews.

I.—**Essai sur les Maladies du Cœur chez les Enfants. Par le Docteur H. René Blache, Ancien interne en médecine et en chirurgie des hôpitaux de Paris, &c. P. Asselin. Paris, 1869. pp. 224.**

An Essay on the Diseases of the Heart in Children. *By* **Dr René Blache.**

In the last number of this *Journal* we had occasion to remark on the occurrence of heart disease in children as being of comparative frequency. Dr West, in his lectures, remarks that "its rarity is not so great as, judging from the silence concerning it of many writers on the diseases of children, you might naturally infer," while Dr Hillier, in his recently published book, says that "endocarditis is commoner in children than is usually supposed." The fact that M. Blache writes an essay of 200 large octavo pages on this subject, may be taken as an index of his idea of its importance. Accordingly, in his opening sentence we are not surprised to find him stating his opinion that the heart "is a good deal oftener affected in its structure and its functions, during the first 15 years of life, than is commonly thought." We hope that these repeated repudiations of the rarity of this affection in childhood may soon become superfluous, and that by calling the attention of the practitioner to the possible presence of this disease, they may direct him more frequently and more carefully to the physical examination of the chest. As the subject seems to us to be one of considerable importance, we submit a short analysis of M. Blache's essay, premising that in giving M. Blache's opinions and statements they are to be regarded, in many instances, as those of the authorities from whom he quotes, rather than as arrived at by his own personal investigations. It is creditable to the author to have consulted so many different memoirs, and we cannot help noticing with satisfaction that a very large proportion of these are in the English language.

Etiology.—The fact that gout and atheroma are almost never met with in children, may possibly account to some extent for the notion of the rarity of heart disease in early life. Rheumatism also is regarded by many as being a rare and usually a trivial affection before the age of puberty.

There is, however, reason to believe that rheumatism in the young subject may exist under forms which are liable to escape attention.

> "At this age, in fact, it is not necessary to believe that rheumatism is limited to the joints and to the serous membranes. It seems to be endowed in the young organism with a power of impregnation and diffusion more considerable than at other periods of life, and to be apt to excite pathological states of a more numerous and more various character. What proves this to be so, is that the most slight and localised manifestations of rheumatism—*Torticollis* and *Erythema nodosum*, for example—are sometimes complicated by endocarditis. Although such a complication is not common, the fact of its occurrence is none the less certain. But it is not at all rare to see heart disease supervening during the course of chorea. There, the rheumatic taint assumes a singular aspect; it manifests itself under the form of chorea; meanwhile, it remains only too faithful to itself in attacking the heart." (pp. 17, 18.)

It will be observed that M. Blache, like his master, M. Roger, regards chorea as a form of rheumatism. Not only may the rheumatic attack be slight or anomalous in its form, but in some cases the cardiac attack may precede the articular affection by several days. Closely related to this same disease is the rheumatoid affection, which is so frequently observed in the course of scarlatina.

> "There exists between rheumatism and scarlatina a singular affinity, which we are compelled to admit, despite the impossibility of giving any explanation of it. . . . In general, scarlatinal rheumatism does not assume any very great gravity; it does not return upon the joints which it has attacked; it is less liable to relapse, is more fixed than ordinary rheumatism, and (in severe forms of scarlatina) is more apt to proceed to suppuration. . . . That which seems to us to give to scarlatina the second place in the etiology of diseases of the heart in the case of children is, in the first place, this fact of a rheumato-scarlatinal diathesis with visceral complications; and in the second place, the possibility of this eruptive fever developing of itself, and apart from all rheumatic intervention, inflammatory affections of the pericardium, with dropsical effusions." (pp. 19-22.)

Although rheumatism and scarlatina are the two principal causes of heart disease, there are many others. Idiopathic inflammation of the pericardium, although exceedingly rare, rests on the authority of Dr West's observation. Inflammations spreading from the lung and pleura may attack the pericardium just as in the adult. Tubercle is perhaps more frequently seen in the pericardium of children than in older subjects. Pyæmia (originating in some cases from the state of the umbilicus) may, of course, implicate the heart and its membranes; this, however, is somewhat rare; but a form of cardiac disease—probably allied to the pyæmic form—is found to occur frequently in a peculiar variety of periostitis, which is especially observed in childhood, and to which attention has been called only of late years.

> "We now come to a cause of secondary endocarditis, which, up to the present time, has attracted but little attention from pathologists, and for the knowledge of which we are indebted to M. Giraldès—we mean *phlegmonous periostitis*; a disease which is frequently met with in children, and which, for a long time, was confounded with typhoid fever, by reason of the similarity of the predominating general symptoms in the two diseases. M. Giraldès has already had frequent opportunity of ascertaining the existence of endocarditis in connection with this disease. . . . The occurrence of endocarditis in the course of phlegmonous periostitis ought not certainly to surprise us, for it is certain that the rheumatic influence, or at least the influence of *cold*, may lead to the development of this form of periostitis; but it is none the less true that this fact has not hitherto been brought sufficiently forward, and so it has seemed to us even more important to call attention to it." (pp. 116, 117.)

If Bright's disease seems so much less potent than usual in the causation of pericarditis in children, we must remember that, in their case, it is the acute form of renal disease which is common, while the chronic may be regarded as comparatively rare—a state of matters the reverse of what occurs in after life. A similar remark applies to the influence of bronchitic affections and emphysema, which do not show so much of the chronic character in young subjects. On the other hand, children are liable to some special influences. Whooping-cough and rickets, so peculiar to childhood, are exceedingly apt to lead to undue pressure on the right cavities of the heart, and so to produce dilatation and hypertrophy. Any communication between the right and left heart not obliterated soon after birth, is also apt to induce disorder of the right cavities. Owing probably to the peculiarities of the fœtal circulation, endocarditis seems to be much commoner on the right than on the left side of the fœtal heart. Of 300 cases of fœtal endocarditis, seen by Rauchfous, of St Petersburgh, only 15 affected the left heart alone. Finally, it is worthy of notice that the injurious influences of the mind, passions, and emotions on the heart may be regarded as almost completely absent in the case of children.

Varieties of heart disease.—With regard to the different forms of heart disease met with in the child, they have already been to some extent indicated in speaking of the causes. M. Blache is inclined to believe in the inflammatory nature of the milky patches so often seen on the pericardium, even when they are situated near to the apex. He narrates two cases. (Obs. IV. and V.) In the former of these—a rickety child—the patch was found to consist of loose connective tissue, with a network of young vessels whose walls had already become quite visible. In the second case, the patch was found on the heart of a child who had died of purulent infection; this patch presented the appearance of being quite recent, as if in the course of formation.

> "These facts, and others which we could adduce were there need, seem to give little support to the theory propounded by Jenner, and adopted by West, as to the formation of those milky patches which are found towards the apex of the left ventricle. (Observe that, in the two cases given above, if the patches were not quite at the apex of the ventricle, they were also far from being at the base.) But Jenner attributes this formation to the rubbing of the heart against the resisting walls of the thorax, especially when these have undergone the distortion usually induced by rickets. We cannot adopt this theory of attrition, however ingenious it may be; and it seems to us that the nature of the changes, and the mode of their development, are too intimately allied to pericardial inflammation to allow us to regard them as independent of this process." (p. 68.)

Of the hæmorrhagic form of pericarditis two varieties may be recognised. In the one, blood is really effused from the fragile vessels, which ramify on the exudation membrane; in the other, there is no pseudo-membrane, but only intense injection, and the exudation is rather sanguinolent than really bloody. As to the seat of valvular lesions in the child, M. Blache says:—

> "Mitral affections are more frequent than aortic; amongst the former, mitral insufficiency, which is often found in the adult, is found still more often in the child. On the other hand, aortic insufficiency is certainly more rare in the early period of life than at a more mature age." "Mitral insufficiency is often accompanied by contraction of the orifice, especially when the disease takes a progressive course." "Contractions of the aortic orifice do not always depend on a valvular lesion: the valves may be sound, while the contraction exists above or below them." "Aortic insufficiency rarely exists without some other affection of the heart. This disease is infinitely rarer in young children than in those who approach puberty." "There is no doubt that valvular lesions of the right side of the heart occur by preference when there is an abnormal communication between the two sides of the heart." (pp. 136-162.)

Primary hypertrophy of the heart the author regards as being excessively rare, and he thinks that the reports of cases of hypertrophy of the left ventricle, with contraction of its cavity, are based on a misinterpretation of the *post mortem* evidence. Hypertrophy, as a development of valvular disease and of chronic pericarditis, is common enough, but is usually associated with dilatation; to which affection, indeed, children seem especially liable. The disorders of the respiratory system, to which children are so liable,—

threatenings of asphyxia, croup, laryngismus, bronchopneumonia, capillary bronchitis, and whooping-cough, are all apt to cause dilatation of the right cavities.

M. Blache devotes a chapter to Myocarditis. This is one of the most interesting portions of the essay, bringing together, as it does from various sources, several curious and rare cases. Various lesions are described as found in the muscular structure of the heart: these range from a degree of simple softening up to the formation of abscess. There may be one or more abscesses, and they may be large or small. Sometimes the affection of the walls of the heart seems to be induced by inflammation of the lining membrane; in other cases it is contended that myocarditis excites pericarditis. The seat of the affection is said by Rokitansky to be in the walls of the left ventricle, but the author agrees with Dittrich in regarding the septum of the ventricles as being sometimes involved. This would account for the communication occasionally observed between the two sides of the heart in cases where the margins of the opening are composed of cicatricial tissue. The presence of such tissue indicates the previous existence of some inflammatory process. To this same cause may be attributed the so-called aneurism of the heart in young children.

> "In consequence of acute myocarditis an exudation is formed, which becomes transformed into fibrous tissue; this young tissue is unable to resist the force of the blood, and there is thus formed a circumscribed dilatation of the heart." (p. 179.)

There may, however, be some disorder of the heart associated even with a valvular *bruit*, without any organic disease. This would seem to occur in those cases of chorea, where the *bruit* begins after the onset of the chorea, and diminishes gradually as the disease passes off. In such cases we may suppose some want of harmony in the action of the heart (just as in the other muscles), by which the columnæ carneæ, acting spasmodically, pull the valve against the wall of the ventricle, and so allow of some degree of regurgitation during its contraction.

> "According to Bamberger, purely functional disturbances of this valve (the mitral) may suffice to render it insufficient. This phenomenon may be accounted for either by a spasmodic contraction, or by a sort of paralysis of the musculi papillares; in the former case, the mitral valve is stretched, immoveable, along the cardiac wall; in the second case, the valves, no longer held in position, reverse themselves, and float upwards into the auricle at the moment of the systole. We thus see easily how these two contrary conditions of the tensor muscles of the mitral valve may produce

insufficiency. . . . . Another fact, still more important as a cause of insufficiency of the valves, although their tissue may be sound, is the disproportion between their dimensions and that of the dilated orifice. We will have occasion to show immediately the extreme frequency of dilatation in childhood, and consequently to prove the reality of this fact. Gairdner thinks that in dilatation of the ventricle, the valves are insufficient because the musculi papillares are too far off, and that consequently the edges of the valves cannot come into contact. This explanation, although very ably refuted by Skoda, seems to us admissible in those cases where the dilatation is excessive; this especially happens in the case of the right side of the heart." (pp. 138, 139.)

Diagnosis.—The means of diagnosis are, of course, the same for all ages. M. Blache, however, inclines to attribute more certainty to the indications of percussion than to those of auscultation in the case of children. Although some cases of pericarditis are apt to be overlooked on account of the slightness of the *bruit*, or on account of its being masked by other signs in the chest, still, as a rule, cardiac murmurs are proportionately louder and more striking in the young subject. The possibility of the murmur being purely functional, or of anæmic origin must, however, be carefully considered. In some cases of pericarditis the murmur is said to become more fully developed by pressure of the stethoscope. The palpitations seldom or never give rise to the terrible feelings of angina, so common in the adult, and dropsy usually belongs only to the later stages of the disease.

The pulse, of course, indicates by its rapidity the presence of any inflammatory attack; but its special character, as related to heart disease, is a certain disorder of the rhythm, manifesting itself in irregularity and intermissions. Intermittent pulse, however, is found in many other disorders, and, indeed, is so common in childhood as to have but little significance.* A certain reduplication of the heart sounds has been alleged as pathognomonic of adherent pericardium. M. Blache has appended to his essay a short study of the pulse by means of the sphygmograph and cardiograph. He gives tracings obtained from children in health, as well as from those suffering from heart disease.

In Prognosis, M. Blache does not take an absolutely despairing view. He agrees with Drs Latham and West as to there being a certain protective element in the growing heart. Beyond this, the frequent disappearance of murmurs —fairly to be regarded as valvular—in the course of chorea, must not be forgotten, while the possibility of a murmur being of anæmic origin must be carefully considered in forming our prognosis. A case is given, communicated by M. Peter, as an illustration of recovery from valvular disease of the heart; some of the particulars are contained in the following extract:—

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* "Les intermittences sont si frequentes dans l'enfance qu' elles perdent absolument tout caractère pathognomonique." (p. 140.)

> "In *résumé*, here, then, was a child who, at the age of 3 years, had endocarditis in the course of an attack of acute articular rheumatism. This endocarditis was as certain as was its consequence—mitral insufficiency. The acute endocarditis disappeared; the valvular insufficiency, however, persisted for a sufficient length of time to be diagnosed, first by M. Blache, then by M. Roger, and still later by M. Trousseau. These three eminent practitioners believed alike in the incurability of this lesion—thenceforth to be regarded as chronic. I agreed with them. Nevertheless, at the end of a year the physical signs of this lesion had disappeared; and despite the reappearance nearly every year of a bronchitic attack, which, by the rapidity and intensity of its character, ought to be put down to the rheumatic diathesis, the cardiac murmur has never returned up to this present time, and so we may consider the child as completely recovered from the valvular lesion." (pp. 147, 148.)

In Treatment, M. Blache considers that bleeding is indicated at the commencement of a cardiac affection which has originated from a neighbouring inflammation. Even when arising from a first attack of rheumatism, bleeding is not contra-indicated; in proportion, however, to the repetition of the attacks and to the length of time from the first affection, the contra-indication gains strength. It is seldom necessary to open a vein, local measures are usually sufficient. The author recommends cupping in preference to leeches, on account of the accuracy with which the blood can be measured by the former method, and on account of the frequent mishaps which have followed the bleeding of leech bites in the case of children. Of other remedies, he recommends dry cupping, tincture of iodine, and blisters. Powerful drastics are seldom desirable in the case of children. Emetics are indicated in bronchitic complications. At the head of cardiovascular sedatives and diuretics he places digitalis.

> "Its influence on the heart, at once sedative, tonic, and regulating, is a fact which cannot be disputed. It dissipates, sometimes in a wonderful manner, the dyspnœa which characterises cardiac asthma. But just as this medicine is efficacious when properly administered, so does its use become dangerous if it be given in too strong doses." (p. 48.)

To avoid such dangers, the author recommends the use of preparations of definite strength,—either of the leaves of the plant or of its alkaloid. The administration should be begun by very small doses, and it should be intermitted from time to time to prevent dangerous cumulation. Narcotics are indicated for calming irritability and diminishing pain. Tonics, especially iron, quinine, and arsenic, are even more important in the treatment of heart disease in children than at other periods of life, as anæmia is at this age the most common complication of these affections. Stimulants are indicated in the cachectic forms of the disease, and when there is a tendency to syncope.

Although we have been at some pains to present an analysis of M. Blache's essay, one of the most valuable portions necessarily escapes us. We refer to the cases. Of these there are 57, compiled from all sorts of sources, and many of them hitherto unpublished. They render the work very useful for reference to any one engaged in special inquiries on this subject.

We have not interrupted the exposition of the views at which the author has arrived by any critical remarks. We have preferred to submit them as they stand, our main purpose being to call the attention of the reader to the frequent occurrence of this class of diseases in childhood. M. Blache states the results of his inquiry with much modesty, and we are well pleased to find evidences of a certain enthusiasm in the pursuit of his investigations. Such enthusiasm is specially necessary to enable anyone to surmount the difficulties attendant on the study of pædiatrics. It is all the more pleasing to observe this feature in the character of the writer, inasmuch as he reminds us that it may in his case be regarded as traditional.

II.—1. DISINFECTANTS AND DISINFECTION. *By* ROBERT ANGUS SMITH, Ph.D., F.R.S., F.C.S. pp. 138. Edinburgh: Edmonston & Douglas. 1869.

2. DÉSINFECTANTS. *Article by* M. ROUSSIN, *in* Nouvelle Dictionnaire de Medecine et de Chirurgie pratiques.

THIS work, though containing many valuable experimental observations, is scarcely of such interest to the ordinary medical reader as might have been expected from the title. Dr Angus Smith, from his scientific and official position, must be listened to on all questions of atmospheric vitiation, and a treatise on "Disinfectants" from his pen could hardly fail of favourable reception, even from the reputation of its author. The title is sufficiently convenient, admitting of at least two interpretations, which may be illustrated either singly or together. A treatise on one, however, to the exclusion of the other, though perhaps good in law, will scarcely hold in equity, and this, to our mind, is the chief defect in the present volume. Accurate phraseology is of considerable importance in the statement of scientific results, but "disinfection," though etymologically the averting of morbific infection, has unfortunately, in addition, come to mean the keeping in abeyance of organic putrefaction. These two conditions are not identical or even parallel. The first, though perhaps not a very extensive subject, is as important, complex, and difficult of elucidation as any with which the scientific inquirer has to deal. The investigation must be absolutely experimental, conducted on living beings and on the large scale, under exceptional and grievous circumstances, in presence of countless disturbing influences, any one of which may invalidate elaborate conclusions. Now, in this volume, though professedly a record of his "experience in attempting to obtain results by exact methods hitherto untried," Dr Angus Smith indicates nothing of the kind, and just because he has followed almost exclusively the other line of inquiry.

> "The first division [of Colysis] may be made to include *Anæsthetics*—substances which restrain the vital action in animals; the second may include *Antiseptics*—substances which prevent decay in animal and vegetable matter, for use, beauty, or sentiment; the third, *Disinfectants*—substances which prevent or remove the corrupt state of organic bodies, solely to prevent them injuring the atmosphere." (p. 1.)
>
> "The word *infection* has from early times been used in a bad sense, although it means only the power by which one body acts in its own peculiar method on another, or the action itself. . . *Disinfection* . . is applied to the removal of all disagreeable gases and odours, as well as to [of ?] the decomposition which produces them; it therefore includes deodorising. The use of the word in this manner is quite in accordance with the opinion held from the earliest ages, that the infection of fever or plague was either the same as, or distinctly allied to, these gases." (p. 8.)
>
> "I hope I do not go too far when I suppose classes of disease caused—1st, *by gases*. . . 2d, *by vapours*. . . 3d, *by putrid or decomposing substances;* and 4th, *by organised bodies in various stages and ferments.* Disinfection is the destruction of one or all." (p. 23.)

These definitions, except the last, are not devoid of ambiguity and confusion of idea. Infection is a very special instance of "the power by which one body acts in its own peculiar method on another." Thus, it would hardly be correct to call by this name either the mutual gravitation of the planets, or the slaking of quicklime with cold water. Dr Smith, whose classical recollections are attested by numerous references to old authors, must recollect the maxim of Horace,

Usus
Quem penes arbitrium est et jus et norma loquendi.

The generally received idea, then, of infection is rather the invisible and intangible process, by which specific disease is transmitted from a recognised source to a healthy individual, who thereby becomes similarly affected. Disinfection proper is, of course, the prevention somehow of this untoward effect. To be sure, there are some who deny the existence of infection matter, and even the communicability of disease, but as these views are probably erroneous and are not entertained by our author, they need not be further referred to.

The relation of certain odours to epidemic disease is quite fanciful, and to quote the authority of the ancients in this, as in most matters of natural science, is waste of time. The "noisome pestilence" is still unknown to us. Neither is there any peculiar or generic "smell of skin diseases" which the London nurse could prefer to that of carbolic acid. (p. 133.) Foul gases or odours neither of themselves directly produce definite morbid states, nor indicate the presence of disease, nor does their absence guarantee our security. No "catching" diseases prevail exceptionally among those whose occupation exposes them to the most nauseous emanations, as in removing night-soil, or in manure works, or tan yards. Persons occasionally describe a "nasty smell" as occurring at the beginning of some sickness; but this is generally perceived too late to be included among the proximate causes, and at best may rank among the coincidences. Inoculation with dead animal matter is generally understood to be most dangerous before putrefaction has become evident, while the remains are not yet discoloured or offensive; and every one knows that the lymph, for successful vaccination, should be perfectly clear and transparent, without the least trace of decomposition.

The ultimate aim and object of disinfection proper is the arrest or prevention of disease, not of offensive odours. The inquiry naturally devolves on those engaged in the active practical treatment of the sick, whether human or brute, and assumes very different proportions from the preservation of raw meat or fish untainted, or the cleansing of a urinal. These questions may be submitted to direct and easy experiments, but different groups of healthy persons cannot be shut up with cases, say of epidemic cholera, and one party treated with chloride of lime, another with carbolic acid, and so on, till the perfect disinfectant is arrived at. Failing this, in the belief that the means by which infection operates are at least material and organic, we seek to act upon them by energetic substances, which either form with animal products new and more stable combinations, or preserve them unalterable for an indefinite period—in fact, do away with the phenomena of putrefaction. This is the only ground common to deodorising and disinfection. Still, notwithstanding the excellence of the deodorants and antiseptics which chemistry has supplied, their influence in staying an epidemic is but partial. Our knowledge advances in this direction with exceeding slowness, and there is abundant scope for improvement and discovery.

The isolation of infection matter is an interesting and important inquiry, but the gases of ponds, coal pits, putrefying blood, and river sewage, are scarce likely to contain any. As it is, Dr Smith finds there only a variety of gases, every one of which, except oxygen, may occur in inferior illuminating coal gas. To be sure, there may be, in addition, a fœtid organic substance, but it obtains no more than a passing notice. What are the infectious "Dangers to be Averted" in such places? Why not rather examine the gases of *post-mortem* tympanites, or the breath exhaled in measles?

The list of disinfectants is tolerably copious, but arranged almost at random. Why should oxygen and peroxide of hydrogen be at one end of the series, with air and ozone at the other? Vinegar is treated at twice as much length as Condy's fluid; chloride of zinc is dismissed in a line, but "metallic fumigation" fills a page. Much space which might have been with advantage devoted to the preparation and estimation of the various substances, is given up to would-be poetical rhapsodising and quotations from antiquity and the middle ages. We learn that the disinfection approved by Ulysses is not yet out of date, and that new flannel cures wounds by virtue of the sulphur imparted to it in bleaching; but the efficacy of sulphur in checking the spread of disease is illustrated only by the fact, that under the use of sulphite of soda the stock of one proprietor became weaker, but did not take cattle-plague, which was then in the vicinity. Carbolic acid is reviewed more in detail, and of course most favourably, but the only experiment with it goes to show that of four animals with cattle-plague, treated by injection of full quantities into the veins, three died on the sixth day after, and a fifth cow expired in a rigor during the operation. There is not a word about its use as a surgical dressing, so keenly debated within the last five years, and so much depended on in support of the germ theory of putrefaction and disease, which Dr Smith seems to adopt. The solutions recommended for outhouse use are somewhat weak, although, indeed, the crude acid is not readily soluble, and if there is anything in atmospheric disinfection, some attempt might have been made to disengage its vapour abundantly and continuously. A good method of effecting this, so far as mechanical details go, is described in this *Journal* for last February.

Some twenty-two pages are occupied with interesting original experiments on the interference of excess of water with the preservation of animal matter, on the deodorising of putrid material, and on the comparative preservative properties of some gases, and of the vapours of several vapours including those of many aromatic essential oils. This is by far the most pleasing portion of the work, and will be of much assistance to succeeding experimentalists.

The article "Désinfectants" in this voluminous dictionary is a good epitome of our present knowledge of the subject. Dr Angus Smith's treatise, it may be remarked, appears among the works of reference at the end ; Mr Condy's is introduced as if French. M. Roussin professes no originality, but gives a clear and comprehensive outline of the chief methods for the prevention, arrest, or mitigation of putrefaction, with a preliminary sketch of the theories and phenomena of putrefactive change, and a more than tacit recognition of the germ hypothesis.

III.—DISEASES AND INJURIES OF THE EYE; THEIR MEDICAL AND SURGICAL TREATMENT. *By* GEORGE LAWSON, F.R.C.S., *Surgeon to the London Ophthalmic Hospital, Moorfields, &c.* pp. 340. London: Renshaw. 1869.

DR LAWSON is favourably known as the author of a valuable work on, "The Injuries of the Eye, &c." In the present volume, he has succeeded in comprising within moderate limits a very complete and succinct account of the diseases and injuries of the eye, consisting mainly of his own experience and the practice of his colleagues at the Royal London Ophthalmic Hospital. The scope of the work necessarily precludes profusion of detail and original research, but the student and general practitioner will there find a brief and intelligible account of all the more important affections of the eye, and in a very accessible form. The great advances made in our knowledge of the pathology, and the improved means of diagnosis, of many hitherto obscure diseases, are fully discussed. The numerous novelties of practice introduced in recent years receive suitable mention, though not to the exclusion of old and well established, and on the whole equally successful modes of treatment. These and other excellent features of this little manual render it at once a safe and thoroughly trustworthy guide to the study of this special class of diseases; and from its eminently practical character, it must be a great acquisition to the library of the busy practitioner. The value of the work is considerably enhanced by an appendix containing an excellent selection of formulæ, suitable to the various affections of the eye.

Clinical Record.

I.—REMARKABLE CASE OF INTUSSUSCEPTION IN AN INFANT.

Reported by J. G. Wilson, M.D., F.R.S.E., *Professor of Midwifery in Anderson's University, &c.*

The following case appears to me to possess such features of interest as to make it worthy of being placed on record. The history and symptoms of the case are briefly these:—A female child, four months old, well nourished, and previously healthy, died after an illness of seven days, with symptoms indicating some mechanical obstruction of the bowels. The prominent symptoms during the illness were—distressing and persistent vomiting, first of biliary, then of semi-feculent, matter; frequent muco-sanguineous discharges per anum; obstinate constipation; hiccup; gradually increasing tympanitic distension of the abdomen, &c. Till within a few hours of death the little patient appeared to suffer no pain, the countenance being always calm and placid. She took milk or other liquids eagerly. The vomiting was almost immediately renewed whenever either food or medicine was given. For five days before death there was no feculent discharge from the bowels. Although the abdomen was highly distended, there was no apparent tenderness anywhere on pressure; it was quite tympanitic, with the exception of the lower portion of the left side, where there was marked dulness on percussion.

All attempts to evacuate the bowels by castor oil, magnesia, calomel, &c., having failed, opiates were administered at short intervals, with the view of controlling the disordered peristaltic action. At the same time warm poultices, alternately with hot fomentations, were continuously applied over the abdomen. Warm olive oil, warm water, &c., were at intervals injected into the bowels through an elastic tube, passed well up into the rectum. These means, unfortunately, proved of no avail. A medium sized male elastic catheter was, on two different occasions, passed about six inches per rectum; but I suspect that it did not pass that length along the bowels, but had got bent or doubled upon itself. I should mention that Professor Rainy and Dr Andrew Anderson saw this child in consultation with me.

An inspection of the body was made 24 hours after death by Professor Rainy and myself. The following is a report prepared by Mr. J. R. Watt, my hospital assistant:—

The body was in good condition, the abdomen discoloured and distended, which, on percussion, was found to be caused by the presence of gas. On laying open the abdomen, the viscera seemed to be normal in position and appearance, but no portion of the colon was visible. Two ligatures were applied below the pylorus, and the gut was divided and carefully detached, when, on reaching the left ilio-lumbar region, a firm mass appeared, about five inches long and three in circumference, into which the lower portion of the ileum was continued. Here a couple of ligatures were applied, and the gut removed. On further examination, this enlargement was found to terminate inferiorly at the upper extremity of the first portion of the rectum; another ligature was placed here, and the abnormality lifted out. The whole of the colon was invaginated and formed this large mass, the external layer of which was formed by the descending colon which contained from without, inwards, in succession, the transverse and ascending portions, the terminal portion of the ileum and caput cæcum coli, which last seemed to have been arrested in its course downwards at the upper portion of the first part of the rectum on account of its size. It was laid open from end to end as the successive layers presented themselves, its colour becoming very dark on nearing the caput cæcum coli, the walls of which were much thickened, apparently from disease, and their internal structures obliterated. Thus, to all appearance, the invagination had originated with the caput cæcum coli, which gradually progressed until the whole of the colon was included in it.

II.—CASE OF IMPACTION OF DAMSON STONES IN THE RECTUM OF A CHILD.

Reported by JOHN MITCHELL, M.D., *Barnard Castle.*

MR A—— called on the 18th Oct., 1869, and requested me to send his son, aged two years and nine months, "some medicine for the diarrhœa." In course of conversation he stated that he was afraid the child had swallowed two or three damson stones, for, on giving him castor oil the day before, some had come away. When I called later in the day I found him free from fever, with the pulse little accelerated, and no tenderness over the bowels,—but suffering from paroxysms of pain, recurring at irregular intervals. Next morning his father came to say that he had removed a "canny few" stones from him during the night, that he feared there were still some remaining, and asked me to see him soon. Following him home, I made him place the boy on his knee, in lithotomy position, and removed from the rectum, by the finger, upwards of one hundred stones. Finding that still some remained, which I could not reach, I administered an enema, and then removed the whole. Altogether, I took away one hundred and forty-two; and, as his father thought, he might have got a "dozen or twa," it is probable, on a moderate calculation, that this child had swallowed no fewer than one hundred and sixty damson stones. He was convalescent next day, and has since suffered no inconvenience.

III.—CASE OF COMPLEX PRESENTATION.

Reported by William Alexander, M.D., *Dundonald.*

Mrs R., in the beginning of the seventh month of her tenth pregnancy, awoke on the morning of the 23rd July, as she said, "swimming in water," and then sent for me. She had no labour pains, but it was evident that the membranes had given way, and a sufficiency of water had escaped, not only to soak the bed, but to pass through it and wet the floor. The os was patent enough to admit a finger easily, but no presentation could be felt. Rest was enjoined, and an opiate given.

Mrs R. kept her bed till the 1st of September, when illness in the family required her to get up occasionally, and undergo some fatigue. Slight labour pains came on, for the first time, on the morning of the 5th Sept., and as they were getting more severe after midday, I was sent for at half-past three o'clock. On arriving, and making an examination, I found, first, a hand, and then the head, low down in the pelvis, during the pain which was then upon her. On the pain ceasing, a further examination detected another hand on the opposite side of the head, and two feet pressing against the forehead in the hollow of the sacrum. I then began to think I had got a twin case to deal with; that the head and hands of one child were coming down, and the feet of the other. While thus in a state of suspense, another powerful pain came on, during which I found the presenting parts advancing towards the birth, retaining their relative positions. A third pain put the perineum upon the stretch, and two more sufficed to deliver a living child at four o'clock, with a hand on each side of the head, and the feet pressing against the face of the child; the breech being, of course, the last part expelled.

Remarks.—A presentation of this kind is, I believe, of very rare occurrence, and is merely alluded to in any work on midwifery which I have seen, without any particular rules being given for the management of it, except that of turning or bringing down the feet when detected early enough to do so. When I made my first examination, I felt puzzled; but, from the smallness of the child, the capacity of the pelvis, and the rapidity of the labour, I was not kept long in suspense. Had circumstances been otherwise, the labour was too far advanced when I was called in to effect delivery by the feet, and the probability is that, if interference had been necessary, the case would not have terminated so favourably for either mother or child.

IV.—CASE OF SYPHILIS TREATED BY THE SUBCUTANEOUS INJECTION OF THE PERCHLORIDE OF MERCURY.

Under the care of Dr M'Call Anderson.

Reported by William MacEwen, M.B., C.M.

C. K., aged 15, worker in pottery, was admitted on Nov. 12, 1869. He was feverish, and complained of rheumatic pains in his right elbow and left shoulder. These had existed for a fortnight, were very severe, most so at night, and were accompanied by swelling of the affected joints. Pulse, 82; of fair strength. Bowels costive. Tongue clean.

On examination of patient, Dr Anderson found that he was labouring under gonorrhœa, complicated with phymosis, and he pointed out that in all probability this was a case of gonorrhœal rheumatism, and not, as at first sight appeared, of rheumatic fever. This opinion was verified by the fact that there was an absence of cardiac affection, and sour-smelling perspiration, such as is so often observed in cases of the latter disease; that the pain was very intense, and that there was no tendency of the inflammation to flit about from one joint to another. He was ordered an injection of sulph. cupri, (gr. 1 to ℥i.) to be used five or six times a day; the following mixture was prescribed on the 16th inst.:—

Ox. Potas. Iodidi, ...	℥i.
Syr. Zingib, ...	℥vi.
Tinct. Gentian. Co., ...	℥iv.
Aq. ad, ...	℥xxiv.

Sig., a table spoonful three times daily.

In a few days, the inflammation had completely subsided in the left shoulder, but remained obstinately fixed in the elbow. Liniment of iodine was, therefore, ordered to be painted over that part, night and morning, on the 20th Nov.

On the 23rd, the part was decidedly easier, the gonorrhœa had disappeared, and the glans could be uncovered. A superficial cicatrix, with slight induration, was then detected on the prepuce, the inguinal glands were engorged, small coppery stains were detected upon the thighs, a well-marked syphilitic roseola covered the chest and abdomen, and several glands at the back of the neck were found to be enlarged. There were no other constitutional symptoms, there was no fever, the patient felt well.

The previous treatment was stopped, and the following mixture was prescribed for subcutaneous injection.

℞. Hydrarg. perchlor.,... ... ... gr. iv.
Aquæ, ... ℥i.

The first injection was given on the 24th Nov. Every day 15 min. (⅛ grain) was injected into the subcutaneous cellular tissue of back at first, latterly of gluteal region. The pain of the injection was not severe, and was of short duration; and no local inflammatory symptoms were induced. By the 16th Dec. he had had 12 injections (*i. e.*, gr. 1½ of the perchloride had been used).

The glandular enlargements were decidedly diminished, the syphilitic roseola had disappeared, but the coppery stains on the thighs were still visible. There was not the slightest indication of salivation, and the patient felt well in every respect.

The rheumatic affection of the elbow disappeared entirely a few days after the perchloride was commenced. The injections were continued daily until the 2nd January, 1870, by which time 5 grs. had been injected, and he was then dismissed.

V.—CASE OF PUERPERAL CONVULSIONS.

Reported by JOHN B. CASKIE, M.D., *London.*

I WAS sent for at 11.30 p.m., on Sept. 26th last, to attend professionally Mrs C———, 24 years of age, who was reported to be in labour with her first child. On arriving at her residence a few minutes after, I found her suffering from slight uterine pains, recurring every ten minutes. On vaginal examination (during which she evinced unusual sensitiveness and shrinking), I found the os uteri dilated to about the size of a shilling, and the cervix of considerable thickness. The patient was cheerful and in good bodily health, except that she had been suffering, for six weeks previously, from anasarca of the lower limb. The urine tested on September 20th was free from albumen.

From midnight, up till 7 a.m., Sept. 27th, labour made satisfactory progress, and the patient bore up well under the increasing intensity of her pains. At 7.30 a.m. the membranes had ruptured, the head of the child had slipped through the os uteri, and was distending the vaginal walls. There was every prospect of the second stage of labour being speedily terminated by natural efforts. Suddenly, however, and without any premonitory symptoms, saving a short piercing cry, like that so characteristic of epilepsy, the patient became rigid, and then violently convulsed for about 10 minutes.

I waited at the bedside until the convulsion ceased, then hurried to my house, about 150 yards distant, for my forceps, with which I returned without loss of time, and completed the delivery of a full-sized male child. The placenta was soon after voluntarily cast and extruded. The uterus contracted well and regularly. There was very little hemorrhage.

The convulsion was succeeded by the usual comatose state, during which delivery was completed, and patient laid comfortably in bed. At 9 a.m., the coma continuing, the eyeballs oscillating, the pupils widely dilated, and the pulse 110 and firm, a stimulating enema of castor oil, turpentine, and assafœtida was administered. This acted in a few minutes, bringing away a small quantity of soft feculent matter. A catheter was introduced into the bladder, and 6 ounces of urine drawn off. The first two ounces removed were rejected, as containing vaginal secretion and blood ; the urine which followed was tested, and found to contain *albumen.*

At 10 a.m., patient had another severe convulsion. There was now considerable suffusion of countenance, and increase of heat in head. Six leeches were ordered to be applied to the temples, and a bladder, filled with pieces of ice, placed over the head. At 11 o'clock, consciousness was regained for the first time since the commencement of the fits, and I began to congratulate myself that the worst was over. I was, however, doomed to disappointment. At 12.30 p.m. I was sent for, and informed that the patient had just had a worse fit than those which preceded it. I arrived in time to find her still convulsed, and at once opened a vein in the arm, and let blood to ℥xv. I ordered the head to be shaved, and the application of ice continued. An enema containing a full dose of tincture of belladonna, was administered. During the afternoon, evening, and up till 2 o'clock next morning, the convulsions continued to return at intervals, but gradually decreased in violence and duration. Patient had, altogether, 16 fits.

Patient remained completely unconscious during the 27th, 28th, 29th, and greater part of the 30th. On the evening of the last mentioned day she regained partial consciousness. She replied intelligently to simple questions, and was persuaded to take food. Her perception and memory remained defective till the following week. Her recovery after that time was rapid, and she regained perfect health.

During patient's unconscious state, nutrient enemata were regularly administered, and the bowels relieved by the addition, when necessary, of aperient medicines to the injections. On the 28th, a liniment, composed of equal quantities of acetum lyttæ and linimentum saponis, was applied to the shaven scalp, and produced a moderate amount of vesication.

Remarks.—This is in some respects a typical case of puerperal convulsions of a severe character. Like the majority of those subjects in whom the disease occurs, the patient was a *primipara.* She never had any fits when a child, but was always rather delicate. For several weeks previous to her confinement she afforded evidence of pressure from the gravid uterus, exerted upon the kidneys or renal vessels, and had been under treatment for dropsical symptoms.

The first stage of labour in this case proceeded naturally, and it is remarkable that while so many usually suffer from disturbance of the stomach during the progress of dilatation of the os uteri, this patient was not affected in this respect. It was not until the head of the child was distending the vaginal walls, that the incident nerves, compressed or strained, propagated sufficient irritation to the nervous-centres to result in convulsions. Bedford states that this is usually the case. There was, however, an additional source of irritation to the nervous system,—the depraved state of the blood, resulting from the impeded functions of the kidneys; the latter was doubtless the cause of the violence and persistence of the fits.

VI.—CASE OF AVULSION OF FOREFINGER, WITH DEEP FLEXOR TENDON ATTACHED.

Reported by DR JAMES DOIG, *Alford.*

I WAS requested to visit J. S., who had received an injury to right forefinger while binding a refractory colt in stable. It seems while so engaged his finger became entangled in a knot of rope, which, by a quick movement of the colt's head, was suddenly drawn through a ringbolt in the manger. The consequence was that the distal phalanx was completely removed. On examination I found him complaining of considerable pain in the stump, and especially along the forearm as far as the bend of elbow. In other respects the arm presented no unusual appearance. After applying the ordinary dressing, I requested a search for the missing member, and was astonished to find attached to it *the whole length of the deep flexor tendon, along with its quota of muscular fibre.* The case, with rest and cold water dressing, gave no trouble.

Obituary.

BIOGRAPHICAL SKETCH OF THE LATE PROFESSOR PENNY.*

By JAMES ADAMS, M.D.

DR FREDERICK PENNY, late Professor of Chemistry in Anderson's University, Glasgow, was born in London, 10th April, 1816, and he died at his residence in Glasgow, 22nd November, 1869, aged 53½ years. He was the third son of Charles Penny, long established as a wholesale stationer in Cheapside, London, and well known as a prominent, energetic, and highly respected merchant. In early infancy Frederick suffered an accidental injury, the effects of which made his after life one of suffering, limiting his activities, and in every way crippling his energies. For some infringement of nursery discipline, his nurserymaid dragged him rudely from bed and cast him on the floor, inflicting thereby an injury which caused a lingering ailment, and resulted in a distorted spine and contracted chest. The ill health consequent upon this treatment did not check his application to study as he grew in years; on the contrary, it seemed to develop habits of perseverance, and a disregard of all temptation to waste of time and thought—a disregard of all that, although desirable, was to his mind not attainable. At school he distinguished himself, and there are living some of his schoolmates and early friends who recollect "the bright-eyed boy" who, on occasions of public display, was called forth to receive the plaudits and carry off the ungrudged prizes which his superior merit and sustained application had fairly earned. He greatly relished the study of mathematics, thus evidencing at an early period the severity of thought and exactness of language which he always exercised to the degree that so peculiarly distinguished him in the pursuits of his after years. He likewise showed an inclination towards chemical studies, and while under his father's roof he very early began to carry on chemical experiments, either for the satisfying of his own doubts, or in corroboration of the recorded observations of others. In accordance with this decided predilection he was, when about 14 years of age, placed, after payment of a large premium, as private pupil with the late Henry Hennell, Esq., Chemical Operator to the Society of Apothecaries, London, and for seven years, in the extensive laboratories of that society, he enjoyed peculiar facilities in carrying on at the same time both theoretical exercises and practical manipulations. During the latter period of his pupilage he received a special training under the immediate direction of Professors Brande and Faraday, at the Royal Institution, London, and during the last year of his apprenticeship he gave himself almost exclusively to original research. At this time he distinguished himself by a most valuable paper, to be found in the Philosophical Transactions of the Royal Society of London, for 1839, on a subject of very great importance—namely, the exact determination of the equivalents of certain elementary bodies. This memoir has long been considered a most important boon to science, and the elaborate researches of Staas on the same subject, recently published, have perfectly verified the results at which Dr Penny arrived 30 years ago. This contribution to science reflects, therefore, very great honour on the originality, patience, ingenuity, and skill which were so early made manifest. It was, consequently, Dr Penny's rare fortune to make a mark in the morning of life that was still a mark, and a valued mark in science, when the last hours of his life were drawing to a close. It is pleasant as well as instructive to note in the same connection, that what was intended for the interests of science, and did actually prove valuable, was also professionally of value to the young student. It assisted to establish his position as a sound as well as an enthusiastic chemist. Though somewhat out of chronological place in our narrative, we record the fact that the talents and acquirements, and especially the practically valuable characteristics of Dr Penny, had been so fully impressed, and so long borne on the minds of those who had witnessed the earliest manifestations of his powers, as that when in June, 1843, his old preceptor, Mr Hennell, was accidentally killed by an explosion of fulminating mercury during an experiment (in which only a chance circumstance prevented Dr Penny from assisting), the Board of Apothecaries offered to him by unanimous assent the vacant office. His early reputation was therefore of a solid character. It directed upon him the attention of that great chemist so recently deceased, the late Professor Graham, Master of the Mint.

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* This biographical sketch is abridged for the *Journal*, from a more extended Memoir which Dr Adams intends shortly to publish. The Editorial Committee do not wish the publication of the statements and opinions expressed in this sketch to be taken as indicating any judgment in the case on their part. They merely think that Dr Penny's prominent position in the Glasgow Medical School, as well as the general esteem in which he was held by the profession, make it but just to give full expression to a statement, from an acknowledged source, of matters, concerning which much has been said in public and rumoured in private. Dr. Adams willingly takes the responsibility of the whole narrative. —ED. COM.

In 1839 the Chair of Chemistry in Anderson's University, Glasgow, became vacant by the resignation of Dr Gregory, and it was by the urgent counsel of Dr Graham that Frederick Penny, then barely 21 years of age, was encouraged to come to Glasgow, backed by a reputation so early acquired, to offer himself a candidate for the vacant office. He was unanimously appointed, and Glasgow henceforth became his home and the field of his labours. But he found Anderson's University in a very depressed position, and of all its departments of teaching, that of chemistry was in the worst case. Not one of his predecessors had succeeded in making the chair remunerative, and the immediately preceding occupant, the late eminent Dr Gregory, not only was unable to realise as much as pay the rental which the directors demanded for the rooms, and which in his case they were compelled to abate altogether during the two years of his occupancy, but they had actually to contribute to cover the wages of an assistant for the conduct of the necessary experimental illustrations. The greatest total number of students enrolled by Dr Gregory was 58. Excepting, therefore, the prized title of Professor, and the privilege to occupy the bare walls, bare tables, and empty cupboards which constituted the laboratory, Dr Penny received nothing from, and owed nothing to, the Institution. Apparatus, assistants, materials for use and illustration, coals, gas, rent, taxes, &c., were to be supplied as he best could. A perfect stranger in Glasgow, not having a friend with whom to shake hands, he nevertheless entered upon his bold enterprise with a zeal and confidence that astonished all who had not yet recognised the resolute will and acute intellect that dwelt within that feeble frame. The chemistry class at the Andersonian began to have life—the charm of his clear, simple, and yet elegant language attracted hearers, and elicited after-comments in every circle from which his audiences were drawn. Very soon the Chemistry Department of Anderson's University had outside importance, and ere long it stood second to no British school of chemistry out of London. The fame of the Chair grew till it became national, and students came from all parts of the kingdom to sit at the feet of the accomplished Professor. Even in the first year he enrolled 87 pupils; and this altered state of things was continuous and progressive, so that at the time of his death the attendance of his laboratory pupils was more numerous than in any laboratory in this country, with the barest possible exception of the Royal College of Chemistry, London, while the total number of the pupils for the last session exceeded 800. On several occasions the accommodation provided for students required enlargement, while professional employment, as a consulting and analytical chemist flowed upon him in a measure exceeding even his wishes; for his practice, notoriously the largest in Scotland, was reputedly the largest ever enjoyed by a professional chemist in Great Britain. While one man of science is distinguished for his powers as a popular teacher, another for his literary ability, another for scientific acumen, another for genius or original conception, this remarkable peculiarity attached to Professor Penny—that his abilities and his reputation were many-sided. Whether in the laboratory, as the practical preceptor of the educated youth that, in the close relation of master and pupil, venerated and keenly appreciated his clear and carefully considered courses of instruction, or in the lecture-room, as the fascinating expositor of the truths of his favourite science, to the audiences that invariably overcrowded every accommodation that could be provided—or in the consulting-room as the confidential scientific adviser, on whose dictum hung the costly operations of the manufacturer and merchant—or in the private study, as the ingenious practised analyst, whose subtle skill resolved with emphatic clearness the most complicated chemical problems—or in the witness-box, as furnishing the evidence that could so surely be trusted for bringing clearly and pointedly before the minds of the jury and of the bench the information and the convictions of an acute mind that had reached a position entrenched by scientific data, carefully collected, skilfully applied, and accurately reasoned throughout— Professor Penny admittedly stood *facile princeps*.

The famous "Torbanehill Mineral," gave rise to two very noted jury trials. In the first, that of 1853, the fact was elicited that to Dr Penny was due the merit of having discovered and pronounced that the mineral was, for its oil and gas producing qualities, the most valuable mineral in Scotland. In the second trial, that of 1860, the issues almost entirely depended on Dr Penny's evidence, as he had himself made the discovery, which constitutes the merit of Mr Young's process, a year before the date of Mr Young's patent. Opposing counsel did not fail to remember this in cross-examination, but Dr Penny, with self-sacrificing zeal, and animated, moreover, with generous sympathy for a man who, he maintained, had "inaugurated a new manufacture" by the use of an invention which consists "in the *economical production* of paraffin and paraffin oil *in large quantities*," exercised his abilities to the uttermost in Mr Young's behalf, and, to the general belief of all concerned, contributed materially to the gaining of the verdict which secured to Mr Young a gigantic money-making monopoly.

Dr Penny was noted for his appearances in the witness-box in important criminal trials. An eloquent tribute to his memory was paid by Lord Neaves, in his recent inaugural address, from the Chair of the Royal Society, Edinburgh. In criminal cases, during the last 25 years, he was invariably retained by the crown. In the latest important case, that of Dr Pritchard, he suspected the presence of aconite in Battley's solution of opium, and his suspicions were verified by physiological experiments on rabbits, performed by Dr Adams at the request of Dr Penny. In actions involving questions of patent right, and in sanitary questions, the services of Dr Penny were also in great request. At the time of his death he was engaged in important investigations connected with the "North Esk Pollution Case."

Upwards of a year ago Dr Penny found he had realised such a competence—notwithstanding several almost ruinous losses, of which that occasioned by the failure of the Western Bank was the most serious—that he contemplated retirement from active professional exertion. He determined that when suitable arrangements could be made, he would restrict himself to high consulting professional employment, and he projected the publication of several works in connection with manufacturing industry. In 1868, while in England, he wrote, Sept. 26th, to his most confidential friend, referring to a piece of news which had just reached him, to the effect that Mr William Euing, late President of the Andersonian, and Mr James Young, the newly-appointed President, had together paid off the entire debt upon the University Buildings, the existence of which had for many years formed the grounds upon which a rental had been demanded from the Professors of the University. "The munificence of Euing and Young," wrote Dr Penny, "is most princely. It will give the Institution an immense impetus and a *freedom of action* which it has long needed. *Personally* it is a *little* galling that this shower of liberality should have fallen at a time when I am contemplating how and when I shall retire from the scene, *and after* I have paid upwards of £1200 to the Institution in rent and taxes alone." At the end of the winter session of 1868, with his intended retirement in view, he printed and circulated a short note, addressed to the President and Directors of the Andersonian, giving a vidimus of the proceedings of the session, and a short retrospect of his 30 years' professorate. "I have no doubt," he says, "the Directors will share with me the satisfaction I experience in placing on record the results of *the most successful of the thirty years.*" The burden and heat of the day had been borne; the honoured rest had been well earned. The work done had been vast, and the position of the Chemical Chair and the fame of its occupant had become national. In the unusual proceeding of issuing the printed address referred to, Dr Penny had meant to herald his approaching retirement.

"It is hard—very hard," he wrote to his friend a few months ago, "to give up the really splendid income realised from my present position; but . . I may never again have an opportunity of doing it so *gracefully* or so *graciously*." And it was this aim—this weak aim, it may be considered—of doing what he intended to do "gracefully" and "graciously," that in the Doctor's mind was essentially associated with his retirement. It was known to him, as a whispered sarcasm, that he was by some considered only a practical man—a useful manufacturers' man—but not to be named with men of purely scientific renown, and that he worked for gain only, with the spirit of a tradesman. Now that he had reached the goal to which he had restricted his first exertions—viz., that of achieving a fortune or competence, which, next to honourable and fair dealing, he felt to be the most important aim in the life of all men, he desired to show that he had another side to his character, which cavillers had not recognised. It was his wish to carry into comparative retirement his ripe experience and unimpaired energies, and devote them disinterestedly to the advancement of science.

It so chanced at this time that the new President desired to inaugurate his accession to office by sundry benefits, among which he made arrangements for increasing the accommodation for laboratory students, who were much overcrowded, by appropriating to their use the room hitherto occupied by Dr Penny as a private laboratory. In compensation he proposed to give a room, to be taken from the large and commodious premises which had just been added to the University; but the additional accommodation was to be saddled with a burden of additional rent and taxes, and this Dr Penny refused to pay. His acceptance at the particular juncture would, for obvious reasons, very greatly annoy his colleagues, and in all probability frustrate the efforts they were making to get altogether relieved of rent. His predecessor was unable to pay £20 a year of rent, while he had all along paid £38, and it was now proposed to add £16 for a proffered accommodation, which was of little value in his eyes, in view of the short time he purposed retaining his connection with the Institution.

Last autumn, Dr Penny came to Glasgow after a few days' stay in Arran, and preparatory to proceeding for a time to country quarters in N. Wales. On the day after his arrival in town, viz., Sept. 1st, he was startled to read in the morning newspapers an announcement that Mr James Young had "appointed a Professor of Chemistry in Anderson's University,"—that the ten thousand guineas, the exact destination of which had for several weeks been matter of great speculation, and which had been vaguely proclaimed as "a *donation* to Anderson's University," was now in reality to be applied exclusively to secure the success of the new teaching establishment;—and that not only was the wealthy President of Anderson's University the main-stay and creator of the new professorship, but that he had conjoined several of the leading managers with him in a Trust to foster the rival chair. While still in a state of bewildered incredulity regarding this news, he was informed that a meeting of Andersonian Trustees had been held on special summons that same day, that it had been convened professedly "to consider Mr Young's proposal to endow a Chair of Technical Chemistry;" that a legal document had been read to the meeting, confirming the intelligence already conveyed to the public in the morning papers; that powers had been asked, and granted, enabling managers to make immediate arrangements for the new professor, Mr W. H. Perkin, entering upon his duties; and that excepting a formal protest lodged by Dr James Adams after a fruitless attempt to procure a little delay, the whole proceedings had passed almost unanimously in a meeting which lasted only a few minutes. Within 24 hours it transpired that these arrangements had been concocted, and negotiations and operations concluded for the occupation of the premises, fully a week prior to the date of the meeting called "to consider" Mr Young's "proposal." The whole affair was therefore a surprise, unless to those in the immediate secret, and the last man who received the intelligence was one whose reputation and personal interests entitled him to have been the first to be considered and the first to be consulted, after the project had passed out of confidential keeping.

We are all accustomed to read, and to read with some degree of doubt, of the effects occasionally produced upon the condition of the body by powerful emotion or mental shock. But no incident of the kind ever occurred, where the injurious results of unpleasant intelligence were more decided, and more instantaneously apparent, than in the case of Dr Penny. His spirit seemed to sink within him. That honourable and "gracious" voluntary retirement which he had so long meditated, and which he had pictured as closed in and followed with good wishes and generous appreciation, seemed no longer possible to him. If, in tame-souled submission, he now retired, it would appear to the public as though he had been found wanting, and had been superseded. If he lingered for one or more sessions, through a wearing and injurious competition, it could only be to postpone a retirement which would be virtually regarded as a defeat. Farther pecuniary gain he was indifferent to, but he could not disregard the loss of his well-earned laurels. It was very hard, and he felt it to be so;—felt it to be something almost equivalent to his whole life-labour set aside—cast aside, indeed—as a thing of no more account. His first feelings of sorrowful disappointment were followed by reflections of a more irritating kind. The actors in this matter were in the most utter ignorance of his actual pecuniary position, but they were well cognizant of the fact, that he was of feeble body and had passed the productive period of life. His long exertion and pecuniary outlay, during the 30 years he had passed in establishing, in connection with Anderson's University, what had proved a remunerative and famous school of Technical Chemistry, had never received from any one "a single halfpenny of unearned support," nor a single token of appreciation from the managers who were now acting with such sudden haste and fiery energy. He was unable to dissociate, or, rather, he was compelled to contrast the fact, that it was the same wealthy magnate, whose pœans, as a public benefactor, were now ringing in the public ear, who had only a few months before urged him, to the verge of altercation, to burden himself with additional rent and taxes for the use of a single room, to be taken from the same noble premises that were now by the act of this same President, to be appropriated in their entirety, free and endowed, to a rival teacher.

Keen was the pang, but keener 'twas to feel
He nursed the pinion that impelled the steel.

His nights became sleepless, and attended with paroxysms of frightful headache, his appetite failed, and indigestion was followed by distressing eruptions of carbuncular boils, necessitating painful surgical treatment; the mental worry which co-existed with these unhappy conditions crushed him visibly, so that, in the sight of his friends and family, he fell off day after day, and long before the three weeks had expired, when the statutory or general meeting was held, to which he had appealed, he expressed a sure sense that he was "broken down," and that he "felt bruised to death."

The controversy is so recent that it is unnecessary to enlarge upon it. Two pamphlets were published—one by Dr Adams, "Reasons of Protest;" another by Dr Penny, "Letter of Remonstrance and Appeal." General sympathy for Dr Penny was expressed by the press and by individuals in private. Indeed, it was now manifest that the doings of the 1st September would be rescinded at the meeting on the 22nd, and to avoid all appearance of obstructiveness, Dr Penny previously wrote to the managers, concluding thus:—"I am quite willing to vacate my chair, and leave the trustees unfettered by my occupancy, on condition of my receiving a reasonable compensation for my apparatus in the Institution, and for the loss I should thereby incur." The Managers took no notice whatever of this communication! They met and conferred, and then, at the Meeting of Trustees on 22nd September, they proposed a resolution which cancelled the obnoxious proceedings of 1st September. This resolution was readily adopted by the Trustees, a large body of whom only saw in it a recognition on the part of the Managers of illegal action, now clearly admitted, if not repented, and the effect of the resolution was understood to be simply that of maintaining Dr Penny undisturbed in his accustomed position. But the resolution contained these words—"for the reasons stated in the minute of the Managers' meeting of this date." The minute was a long narrative of the reasons which the managers stated had induced them to accept Mr Young's proposal. "The technical objections, however," they said, "taken in the interest of the present Professor, obliged them very reluctantly to recommend the Trustees to withdraw their acceptance," "although it was with much regret they were compelled to recommend the Trustees to sacrifice advantages so large in extent, and of such an important nature, both to Anderson's University and to the public of Glasgow and the West of Scotland." This minute was adopted by the Managers while Dr Penny's communication referred to was lying on the table before the meeting, and it was adroitly tacked to the general resolution. It was an aggravation of all that had been done—an arrow flung by a vanquished and retreating foe. It left a stinging record to the effect that Dr Penny, for personal interests, had interposed a legal machinery, but not a moral right, and had thereby succeeded in preventing a great boon from reaching the public. What seemed to many, therefore, to be the triumphant issue of a struggle, proved in reality the last straw that breaks the camel's back. Sinking daily in bodily health, Dr Penny could not continue the contest. "Aversion to public discussion," he writes to a friend, "indignation . . . . and the secluded character of my work and duties, conspire to unfit me for such struggles. . . . I cannot write; a sense of injustice stamps my thoughts and words—indignation is rampant. . . . . The cruel injustice so apparent on the face of the document has almost paralysed me." Again:—"The Andersonian cruelty pursues me everywhere, and is no respecter of my bed or sleep. I write you after a *bad*, *bad* night."

It soon became only too evident that, although he might rally through time and care, there was a present necessity for a cessation of the Professor's customary labours. The first relief attempted was that of giving up the popular evening class, from which, by a lecture delivered weekly, he realised about £100 for the session. An intimation was forwarded to the Managers, describing the unhappy necessity that existed, "on account of broken health, arising from recent circumstances," for discontinuing this part of his accustomed duties. He had a lingering hope that the communication might invite or offer an opening for negotiation; but a dry, official response, unaccompanied by even a commonplace expression of regret for the state of the Professor's health, dispelled all such expectations. Pressed by the urgent representations of his friend and medical adviser to respect the warnings of "a break-up," which would so surely become a reality if he did not, at whatever cost, give himself for a season to repose and renovation, he had formed that resolution, when one of the most popular of his colleagues (Dr Macleod) was appointed Regius Professor of Surgery in Glasgow University. He then dreaded not only the real injury which would befall the Andersonian by the withdrawal of two of the most popular lecturers from the staff of teachers within only a few days of the opening of the winter session, but he dreaded likewise that an imputation of pique, or actual desire to injure the Institution, would likely enough proceed from the same quarter which had already published misrepresentations of a more unfounded character. He resolved, accordingly, to open the session, and to struggle on till the Christmas holidays, trusting that during the interval some chance or some effort would bring about a solution of the difficulty. With extreme precautions he was conveyed for several mornings in a cab to the lecture-room—on several occasions immediately after undergoing painful incisions through the carbuncular boils that beset his neck and shoulders; but once in his accustomed seat at the lecture-table, his students would hardly have suspected that in the energy and fire of his manner they were witnessing the last glimmerings of a light that was flickering to extinction. Perfectly conscious that he was overstraining his powers, yet hoping against hope, he endeavoured, by friendly deceptions as to his real strength and capabilities, to evade the remonstrances of his medical friend, until Friday, 12th November, when he was got home after lecture in a state of physical prostration so extreme that medical authority could no longer be gainsaid. His medical adviser now sought the counsel of Professor Andrew Buchanan, and those gentlemen continued thereafter with kind attentions to administer such relief as could be given in a case of suffering *that admitted of no scientific definition, and in which no organic disease could be detected*, beyond a long-existing feeble action of the heart. For several days preceding his death his symptoms afforded little hope, and his sufferings were great—chiefly occasioned by paroxysms of distressing breathing and extreme faintness—although at intervals he rallied wonderfully; and on the day of his death his feeling of having got over a crisis, and his hope of regaining strength and health, were for the first time indulged. The same evening he was able to sit up in a bed chair, and about 9 o'clock p.m. spoke cheerfully of several little arrangements by which his strength was to be preserved and recruited during the convalescence to which all now confidently looked forward. He had just been making some little muscular effort to shift his position in bed, when he uttered a distressed exclamation, and called on his friend, Dr Adams, who stood by his bedside, to support him. "Do not press me," he said; "support my head;" then a short pause, and with compressed lips, and eyes gazing sternly into vacancy, as if rallying in an effort to meet the great foe, he passed away.

A warning long previously given by his medical friend had prepared Dr Penny for the fact that his death would be sudden in character, and for 15 years he had looked forward to the event as one that might at any moment occur. It was, therefore, not at all surprising that to the few who administered relief during his later hours he spoke unreservedly of all matters which to him seemed essential for the proper arrangement of his affairs after his decease, and he contemplated the death which he expected not only with the fortitude of a philosopher, but with the calm resignation of a Christian man.

A full picture of Dr Penny's life and character would prove interesting and instructive, even to those who did not regard it in the light and with the interest that personal knowledge gives. The preceding sketch has chiefly reference to the deceased in his relation to public life,—that aspect which was most exposed to critical and oftimes ill-informed regard. And yet when all is said, (and it might be greatly amplified), nothing of a true picture would be given if he was not referred to in the relations of private life, as seen by the small circle of warm and attached friends that his winning nature drew closely around him. The writer has seen much of him during many years,—in the quiet of evening at their respective firesides,—in the social assembly,—in the near companionship of adventurous travel, and in the hard, stern duties of every-day work. The disposition and manners of Dr Penny were hardly less attractive than his genius and professional skill were admirable. Good breeding was so marked a part of his character, that it would have been affectation in him to be otherwise than well-bred. Although of a social disposition, he was unable for many of his later years to go much into society, owing to the pressure of his professional occupation. In the companionship of his chosen friends, where it was his delight, and the only reward of his unremitting labours, to unbend, he was amiable, simple, natural and cheerful. In conversation he never sought to shine by seeking to eclipse others, for by nature he was tolerant—"a good listener." He always extolled the deeds of others with a pleasure and enthusiasm which contrasted with the humility he displayed when referring to his own. The astonishing economy of his time, which enabled him, although by snatches, to overtake an enormous amount of miscellaneous reading,—the vast resources of his memory, and the facile, accurate, and elegant diction in which he conveyed the most minute and diversified information, made intercourse with him a perpetual source of pleasure and of profit. His friendships were few, but they were staunchly genuine. He was of unpretending piety, simple in his religious sentiments, and very tolerant of creeds, "so long as they recognised the universal goodness of God." Engaged, as he almost constantly was, in mental studies of the severest kind, it was a happy circumstance that he possessed within himself sources of the purest enjoyment, from which he found relief from the wearing influences of his professional life. He was fond of travel, and he grudged no pecuniary cost, and otherwise made great sacrifices to secure the holiday excursions which he permitted himself to take. On these occasions he usually shunned city life and ordinary sight-seeing,—seeking, in preference, secluded localities far removed from the ordinary track of travellers, and there, with his sketch-book, his aneroid, telescope, and pocket magnifying-glass, he luxuriated amid what he termed "the gorgeous evidences of the omnipotence of the Almighty." The intensity of his nature in leisure as well as in labour was well shown in this, that after a few days' stay in a new locality, there could not be found a better *cicerone* than Dr Penny. Antiquarian relics—quaint legends—picturesque ruins—the best stand-point from which to view a beautiful landscape, were sought out with eager avidity, and every object which a facile and accurate pencil could delineate was transferred, and treasured up in countless sketches to be at after times brought forward in stimulating and illustrating the reminiscences, "always pleasing," of a "vagabond holiday." In the studies of natural history he took great delight, and it was amusing to observe the earnestness with which he would suddenly diverge, if at the sea coast, to drag a visitor to some pool disclosed at half-tide, where he kept his stock of sea anemones; or make him clamber and wade through some thicket or dirty underground to have the luxuriance of a gigantic fern pointed out; while on reaching his lodging, however temporary, the visitor was alternately startled and interested by the fluttering of his numerous pet birds of all kinds, perching on the Doctor's shoulder or pecking crumbs from his plate at table.

Professor Penny was a Doctor of Philosophy of the University of Giessen, where he studied under Liebig. He was also a Fellow of the Royal Society of Edinburgh, and of the Chemical Society, London, and an associate of many other learned bodies. His contributions to science exist chiefly in a large quantity of unfinished manuscripts, containing records of original research, or in voluminous reports, consisting of critical commentaries and original observations printed for the use of law counsel, or the guidance of manufacturers; or remedial measures in connection with sanitary operations. Of his published memoirs, which are to be found chiefly scattered in scientific periodicals, a short reference may be given to guide the search of those who desire fuller information. The earliest is an elaborate communication to the Royal Society of London, and to be found in their *Philosophical Transactions* for 1839. This paper gives the details of a most painstaking and conclusive investigation for the determination of the atomic weights of chlorine, potassium, silver, and other elementary bodies. His researches showed that the estimates in general use among British chemists were not the strict representatives of chemical truth founded on experiment, and that the favourite hypothesis, of all equivalents being simple multiples of hydrogen, was no longer tenable. The merits of this communication were highly appreciated at the time, and the accuracy of the results have been fully confirmed by subsequent observers. In a paper read to the British Association, 1850, he gives "A New Method for the Determination of Iron in Clay-band and Black-band Ironstone." He is "purposely minute," as he particularly desired that the process might be serviceable to those who, from their pursuits in life, are interested in the value and quality of ironstone, and who may be imperfectly acquainted with analytical operations. The same mode of extricating iron and its oxides might be applied to the analysis of other ores of the same metal, and be equally available for the examination of alum liquors and copperas liquors, and other products in the arts. In a monograph read before the Chemical Society of London, 1852, "On the Valuation of Indigo," he shows the uncertainty, and, in several instances, the positive inaccuracy of the common methods then employed by commercial men for estimating the true value of this article, and he proposes a new method, "based upon the circumstance that indigo blue in presence of hydrochloric acid is discoloured by bichromate of potash," and the process he recommends is, in his opinion, admirably adapted for ascertaining the relative value of indigo blue in samples of commercial indigo, although it does not pretend to supply to scientific men the actual amount. "The Composition and Phosphorescence of Plate Sulphate of Potash" is treated by Dr Penny in a monograph detailing the principal phenomena observed during numerous experiments. The results, although affording very little insight into the cause of the phenomena, "plainly indicate that the emission of light takes place within a limited range of temperature, and that actual contact of the crystals with the crystallising liquid is essential." The subject of that notice is a technical product from kelp, and is a manufacture almost peculiar to Glasgow. The *Philosophical Magazine* for 1852 contains a "Notice on Chloride of Arsenic," written jointly by Dr Penny and by Dr Wallace, of this city. They treat of several points connected with the chemical history of this interesting compound not previously noticed, and their experiments plainly indicate the availability of the chloride of arsenic in medico-legal investigations for the separation of the metal from animal and vegetable matters. This paper was read and discussed at the Philosophical Society of Glasgow in January, 1852. "The Action of Nitric Acid upon Chlorates, Iodates, and Bromates" furnished results so interesting that, believing them to be novel, they were submitted to the Chemical Section of the British Association in 1841. At the same time he described a new salt obtained from iodine and caustic soda. A paper "On the Estimation of Iodine," read before the British Association, and published in 1852, described a process by centigrade analysis, based upon the fact that chromic acid, in presence of hydrochloric acid, causes the complete decomposition of soluble metallic iodides. "A simple Volumetric Process for the Valuation of Cochineal," read to the British Association, 1855, has been found extremely useful in comparing different samples of cochineal, and has proved equally serviceable in examining specimens of lac-dye, than which few commercial substances are more variable in quality. This process is based on the well known bleaching properties of red prussiate of potash in presence of a free alkali. A memoir "On the Valuation and Composition of Proto-Chloride of Tin," read before the Chemical Society, makes known a ready process available to practical men. The agent employed is bichromate of potash, and its application is based upon the fact that chromic acid, in presence of free hydrochloric acid, converts proto-chloride of tin into bichloride, the chromic acid becoming sesquichloride of chromium. Reference has already been made to the pamphlet "On the Detection of Aconite by its Physiological Action," published in 1865 by Dr Penny and Dr James Adams. This comprises details of the experiments made in connection with the trial of Dr E. W. Pritchard, and detailed reports of the chemical analyses. "Notes upon Hungarian Wines," by Dr James Adams and Dr Penny, published July, 1869, is a contribution to the chemistry of wines, a subject to which, as a noted connoisseur, Dr Penny had long paid considerable attention. This was the last subject of scientific research that occupied his labours and his pen.

THE LATE DR JOHN MACFARLANE.

John Macfarlane was a native of Glasgow, being the son of a "Relief" minister in Bridgeton. He studied in the University, and received from it the degree of M.D. in 1824. His death having been preceded by six or seven years' withdrawal from practice, fell less suddenly than usually happens in the case of one not only among the most prominent in the profession for many years, but who was also one of our most conspicuous citizens. His form and stature, before weakness had rounded his broad shoulders into a stoop, was imposing: and the kindly frankness of his address, and especially his look of penetrating good sense and decision, won for him at once that instinctive confidence which is the medical man's indispensable requirement from his patients. His great professional characteristic was the promptitude with which he could seize on the important points in a case, interpret them, and apply the remedy; so that, instead of the over-minute diagnosis and indifference to treatment which glorifies the doctor more than it benefits the patient, he seized upon the essence of the case, whereby all the adjunct symptoms got shaken into their true relative places. Another valuable characteristic of his mind was the power he possessed of passing rapidly from one subject to another, which led some to the mistaken notion that his patient's fate was a matter of comparative indifference to him—a most erroneous misinterpretation of that decision of mind which refused to be long burdened with one subject, and saved him from those tormenting hours in which some physicians occupy themselves in doubting the wisdom of what they have been doing, and thinking, usually erroneously, that they might have treated some case more wisely.

John Macfarlane had a true eye, steady hand, and firm resolution; and in the earlier part of his career, when he practised surgery, all these qualities made him a great reputation in the operating theatre of the Royal Infirmary; and he was not without the sense of his own ability. We remember the peculiar smile with which, on once showing us a new sound of Mr Costello's, he said, "I think I could find my way into the bladder with the old one;" and the way in which, when in the old pre-anæsthetic days, he had performed lithotomy with very unusual rapidity, drawing himself up to his full height in the chair, as he still sat with his back to the students, he held the trophy of his success arm-high in the forceps for them to see.

It is hardly necessary to say that Macfarlane worked hard and steadily. Beginning his practice at the east end of the city, with no advantages but his abilities and the good education of a minister's son, he acquired extensive popularity in the course of his unwearied industry, and, as the years rolled on, rose to the best practice in the city, and, indeed, the West of Scotland generally. One circumstance which greatly prospered him was the high place he held in the esteem of those who had been his pupils, and who looked ever after to him as their trusty adviser and help in all emergencies of practice.

In spite of his early fondness for surgery, he gradually withdrew from operating; and at last, on the death of Dr William Thomson, in 1852, applied for, and obtained, the Chair of Practice of Medicine in the University of Glasgow, which he held for ten years, leaving, however, behind him, as a memorial of his surgery, a volume of very interesting "Reports" of Infirmary and private cases, published in 1832.

For the Chair of Practice of Medicine he was perhaps not altogether fitted. His lectures could not fail to be full of good sense and useful; but he had not had that early and continual practice in teaching which is necessary to attain distinguished excellence in the professorial chair; and latterly, indeed, his failing health rendered the effort of lecturing painful and exhausting. For the toils of practice and the various exposures of his life were now telling on a frame the original robustness of which was not equal to its imposing form; and bronchitis, enlargement of the heart, and other ailments, forced him, in 1862, to retire to Helensburgh, where he lived in comparative seclusion and complete rest. One winter he spent at Torquay, but without much benefit; and latterly was able to see but few of his old friends. Yet when the writer called on him not long ago, he found him full of all his old kindliness, and quite interested in the professional news he had to give. He sunk under one of his severe bronchitic attacks, 7th December, 1869, at the age of 73, and was buried at Glasgow, being followed to the grave by the Faculty of Physicians and Surgeons, of which he was so long an honoured Fellow —A. A.

THE LATE DR ANDREW ANDERSON.

The initials attached to the preceding obituary notice of Dr Macfarlane will be recognised as those of the late President of the Faculty of Physicians and Surgeons, Dr Andrew Anderson. The M.S. was received about a fortnight before his own decease. As a kindly and genial tribute to the memory of an old friend, it forms a harmonious close to the literary work of a life which was throughout singularly free from discord. We reserve for our May number a record of Dr Anderson's life and labours; meanwhile merely recording the sad event.

THE LATE DRS G. BUCHANAN, ALEXANDER, ETC.

The deaths of an unusual number of members of the profession fall to be recorded at this time.

Many of the younger Members of the Glasgow and West of Scotland

Medical Association will lament the abruptly-closed life of Dr George Buchanan, M.A., late Demonstrator of Anatomy in the University of Glasgow. His distinguished career, both as a student of Arts and of Medicine, held out hopes of eminence in his profession, which were, however, doomed to disappointment. He died of diphtheria, December, 1869.

Dr Thomas Alexander was a graduate of the University, and also a Member of the Royal College of Surgeons of England. The incessant tear and wear of professional duties no doubt conduced to the disease which carried him off—valvular disease of the heart. He died 15th December, 1869. He was unobtrusive in manner, kindly in disposition, and leaves not a few very attached friends, both in the profession and among those who were his patients, to lament his removal.

We have to express a regret, unfortunately too often renewed, for the death, from typhus, of another young member of the profession, Dr Scott Aitken, of Greenock. He contracted the disease in the wards of the Infirmary in the course of his duty as Visiting Physician. He was a native of Greenock, and gave promise of a useful and successful career in his native town.

TRANSACTIONS OF
The Medico-Chirurgical Society.

SESSION 1869-70.

THIRD MEETING, 5th November, 1869.—Dr Fleming, President, in the chair.

Mr James St Clair Gray, M.B., Mr Joseph Coats, M.B., Pathologist to the Royal Infirmary, and Mr John Lind, Surgeon, were elected ordinary members.

Dr J. P. Cassells read a paper on

VACCINATION WITH HEIFER LYMPH.

After referring to the growing popular distrust in vaccination, which he thought it not wise altogether to disregard, Dr C. reviewed the present state of divided opinion in the profession, and stated that the following questions required to be decided before the subject of vaccination could be regarded as settled:—

1st. Has humanized vaccine lymph degenerated since Jenner's time?

2nd. Admitting the decline of small-pox since then, how far does this depend on vaccination, and how far on other important changes in the social life of the nation?

3rd. As ordinarily performed, can the operation of vaccination become the medium of conveying the germs of any other disease by way of inoculation?

4th. Are heifer lymph and humanized vaccine lymph identical in their action and effects, and if not, why not?

5th. If there is a difference in the results, does it indicate a difference in their efficacy as prophylactics?

A review of these questions, while it left Dr C. undecided as to the issue of the controversy, so far failed to convince him of the perfect safety of the ordinary method of vaccination (arm to arm), that he felt it to be his duty, pending the settlement of the question on a scientific basis, to return to a method, against the efficacy or the safety of which no breath of suspicion had been raised,—vaccination direct from the heifer. In going to the heifer for lymph, he had gone to the source from whence Jenner himself procured it; and one to which he (Jenner) anticipated it would not unlikely be necessary at some future time to return.

Dr Lyon regarded the discussion of the question as altogether uncalled for, and calculated to inflame and unsettle the minds of the ignorant. In all his long and varied experience he had never seen the least bad effect from vaccination. It was not uncommon to find some skin affection follow vaccination, not as directly communicated by it, but as the result of irritation, brought on the skin by the artificial disease.

Dr Morton said that he understood that the essayist's position was this, that vaccination from the heifer was preferable to vaccination from arm to arm, because while there was a risk of communicating disease by the latter process, there was no such risk by the former. This position he would venture to dispute. Some of the diseases of animals, such as glanders and farcy, are communicable to the human subject, and it was perfectly probable that they might be communicable by vaccination.

Dr Coats said he had not seen in his practice any evil effects of vaccination; but on one occasion he had vaccinated from the cow with the result of making a very bad arm, and thus inducing a much greater dislike of vaccination in the parents than if he had adopted the ordinary process.

Mr John Reid said that when in country practice he had, on three different occasions, vaccinated direct from the cow. The pustule, as it appears on the cow, is small, roundish in form, and differs entirely from the vaccine vesicle as it appears on the child's arm. Having heard that the lymph was strong and energetic in its effects, he took great care, and he found the resulting vesicle in no respect different from that by arm to arm vaccination. He remembered that the inquiry was made by the parents, "Was the cow a healthy one?" so that he feared that the popular fear of the effects of vaccination would hardly be eradicated by a return to this practice. He might also add that the marks on the arms exactly resembled those left by the ordinary vesicles.

Dr Richmond had never seen any evil effect result from vaccination; but he had seen cases where people affirmed that certain diseases which followed some time after vaccination were the effects of it. He generally found that these people did not want proof of the incorrectness of their belief. In cases, for example, where a strumous taint existed, the parents, desirous of ridding themselves of a sense of shame popularly associated with it, were glad to have the opportunity to throw the blame on the vaccination. At the same time he found that, without very great care and attention, the lymph did degenerate, and he thought it a matter of importance to revert occasionally to the cow for a fresh supply. But the practical question was how they were to get it in any quantity. He had sometimes gone long journeys into the country to procure it, and had returned disappointed. The Vaccine Institution in London had failed in its duty in this respect, that it had not more frequently reverted to the cow for a supply; and hence the matter from this institution was often worth little. With proper care, no injury, he believed, followed vaccination from the cow.

Dr Renfrew said that he had seen no serious harm result from arm to arm vaccination—occasionally eczema, there being a proclivity to this disease in some children; but the evils produced in this way were trifling when compared with the great advantages it gave as a prophylactic against small-pox. Some of the queries propounded by Dr Cassells would certainly not be easily solved—for example, no person now living had seen Jenner's vesicles, and therefore it was impossible to say whether they differed from those seen at the present day.

Dr Perry said that he demurred to the statements made by some of the speakers, that syphilis is not transmissible by vaccination. Some years ago the late Dr A. Buchanan, jun., read a paper, in which he brought forward a number of cases to prove that the disease can be transmitted by vaccination. In his (Dr Perry's) own practice he had seen three distinct cases in which syphilis was apparently communicated by vaccination. At the same time he was quite aware of the necessity for exercising great caution in forming conclusions on these cases. Two occurred in a public dispensary. In both, undoubted chancres formed on the site of the vaccination. Of course it was possible that the disease was not communicated through the lymph; it is possible that the children may have been inoculated with the syphilitic virus on the same spot at home, or that some foul instrument had caused the disease. He was unable to trace the history of the children; but they both had secondary symptoms as well. The third case occurred in his private practice, though it was not vaccinated by himself, but by a friend during his illness. The child had healthy parents, and could hardly have been exposed to infection at home. In this case also a chancre formed on the child's arm, and secondary symptoms followed, though it is right to add that the gentleman who performed the operation stated that he had vaccinated another child with the same lymph, and no bad results followed. Great caution was necessary in forming a judgment in such a case; but on the general question he had no doubt that lymph taken from a syphilitic patient can reproduce the disease in the child.

Dr Gray said he believed that Dr Buchanan, in the paper to which Dr Perry referred, said that lymph, when unmixed with blood, could not reproduce the disease. He had seen more than one case in which a large ulcer had formed on the arm from the want of attention of the nurse, and of course the vaccination got the blame.

Dr Hugh Thomson regretted that the histories of Dr Perry's cases could not be traced, as it was quite clear that if the children from whom the lymph was taken were healthy, the disease could not have been communicated by the lymph. The mere fact that a chancre arose upon the site of a vaccine vesicle, viewed separately and without any corroborative evidence derived from the lymph, was no proof that the disease had been communicated by the vaccine.

Dr Howatt said that it was of great importance to improve the quality of the lymph by a careful selection of healthy children. The literature of vaccination brings this into prominence, and it was a point germane to the subject under discussion.

Dr Fleming had for many years firmly held the opinion that syphilis was not transmissible by vaccine lymph; but about fifteen years ago his conviction in the accuracy of this doctrine was greatly shaken. At that time he vaccinated a healthy child, an imperfect vesicle formed, and very shortly afterwards distinct symptoms of secondary syphilis showed themselves—shrivelled skin, the peculiar condition of the nates, sore mouth, &c.—and the child ultimately died. The opinion he formed at the time was that the child had been poisoned through the vaccine lymph, which, he believed, was got from a public institution. He had of course been unable to trace the disease directly to the child from whom the lymph was taken; but he was certain that the father and mother were very respectable people, that the child had apparently no syphilitic taint prior to the vaccination, and that the other children of the same parents had no syphilitic taint. Deday was strongly of the opinion of the possibility of communicating syphilis by vaccination, and he believed that the faith of the great bulk of the profession in the opposite doctrine was much less strong than it was several years ago. There must be a series of carefully conducted experiments and observations before the question could be decided. In the present state of the question, while he would strongly uphold compulsory vaccination, he would give the people the choice of having the lymph from the human subject or from the cow.

Dr Cassells, after referring to the many eminent names ranged on his side of the argument, said that he demurred entirely to the plea that the opening up of such a discussion had a prejudicial effect on the minds of the ignorant, as that was the very class whom it was especially necessary to enlighten. With regard to the origin of his experimenting with cow-pox lymph, at first it was with him a personal question. He saw facts which he could not explain, nor satisfy his mind upon. At this time he had a child of his own to vaccinate, and several children of intimate friends. When in this state of mind, he read in a Journal of Dr Blanc's experiments, and requested from him a supply of genuine cow-pox lymph. He carried the process through, and first vaccinated with the cow-pox lymph 17 or 18 children, and at the same time three children with humanized lymph, and the difference in the vesicles formed by the two kinds of lymph was very marked, those from the cow-pox lymph being very much superior to the others. Dr Cassells then described his mode of vaccinating the heifer.

The vaccination is performed on the mamma of the heifer (7 months old, Dr C. prefers), the part having been previously shaved and washed with tepid water. The incisions must be made with a sharp, clean lancet, about ¾-inch apart, remembering that the skin is tender and highly vascular. Into these incisions *cow-pox lymph* is blown, and rubbed with the handle of the scalpel into the wound. When the parts are dry the heifer is turned into the fields. *On the 5th clear day* after vaccination the animal is secured, and the vesicles being grasped with a pair of clean broad-pointed forceps, the capillary tubes are filled. This lymph is employed for *human vaccination*, but for *vaccinating other heifers*, the "matter" must be taken in the same manner from the unbroken vesicles *on the 6th day.*

FOURTH MEETING, 3rd Dec., 1869.—Dr Fleming, President, in the chair. Dr *Alex. Lindsay* read a paper on

QUESTIONS RELATING TO SPORES AND SPORULES, WITH SPECIAL REFERENCE TO ANTISEPTIC TREATMENT.

1. Seeing we have proof, from the siliceous and calcareous remains of plants and animals low in the scale of life, that species existed in the long geological past that are represented by similar species in our own times,—

Is it not reasonable to conclude that plants and animals equally low in organisation, and equally widely diffused, should have an equally specific permanence, although, from the nature of their structure, they afford no evidence of a former existence? If not, why?

2. Seeing that fungi are ever present in the decomposition known as *fermentation*, and that vibrios are ever associated with the decomposition known as *putrefaction*, must this not have been in all time? Is this not a proof of their specific permanence? If this is denied, then on what grounds? If it is urged that they are of spontaneous origin, then why are such varied means adopted to secure their continuance and propagation—*e.g.*, why have the fungi spores?

3. Seeing that the organisms named are ever associated with the resolution of organic combinations into simple or binary compounds, and seeing that in lowered states of vitality they make themselves manifest, are surgical cases not equally liable to their operation?

4. The formation of pus in these cases is a destructive process, and may they not increase the tendency to its production or formation?

5. Carbolic acid, applied according to the so-called antiseptic principles, in many cases checks the formation of pus. If this is not explained by the exclusion of the destructive agents, then what *is* the explanation?

Dr Morton said that as Dr Lindsay in his paper had fallen into an error regarding the character of the paper which he (Dr M.) had read before the Society at a late meeting, he must explain that that paper was strictly of a practical character, that in it he distinctly declined to enter into the consideration of the spore theory, though he stated at the same time his conviction that the spore theory, as explaining septic action in wounds and abscesses, was not now generally entertained. With respect to the healing of a psoas abscess, the case which Dr Lindsay had mentioned was by no means unique. He himself had seen such cases, and notably one such, in which a servant in the Infirmary had got quite well from the abscess drying up.

Mr John Reid said that he had always held that the cases of psoas abcess brought forward by Mr Lister were the weakest points in his argument. They knew where the matter in such cases came from—perhaps some 12 inches from the opening; how the fumes of the acid are ever to reach the origin of the abscess, was a mystery which he could not understand. He had seen cases in which such abscesses dried up without any antiseptic treatment.

Dr Eben. Watson said that he was certainly not prepared to give a categorical answer to Dr Lindsay's questions, and possibly they might never arrive at satisfactory conclusions. Any one who has read with care the discussions and results of experiments in the French Academy on spores, must know that these results were so contradictory, that it was almost impossible for an unbiassed reader to come to any conclusion at all. One set of experiments yielded results which were directly contradicted by those which followed. The experiment which had impressed his own mind most strongly was that in which the air was admitted through a red-hot tube—maintained red-hot during the experiment. It was evident that under this condition no sporule could live, nor fructification of fungi take place in the fermenting fluid, and yet to all appearance sporules did exist in the fluid, though under the conditions of the experiment it was utterly inconceivable that organic germs could be admitted. As most of them were aware, Dr

J. H. Bennett, in a paper published two years ago, showed that in every organic fluid, independent of the admission of air, an aggregation of molecular particles arranged themselves rectilineally to form bacteria, and then, by a method of secondary junction, which Bennett and others had seen, formed vibrios, or bodies so like vibrios that they cannot be distinguished from them; and these bodies had the power of moving. He (Dr W.) was therefore inclined to believe that many of these bodies, which look so like fungi, are really not organic bodies at all, but are simply molecular aggregations of matter. In regard to the application of antiseptic substances, he quite agreed with Dr Lindsay that they must be applied on a theory; there could be no science without principles. But it did not necessarily follow that they must agree with this atmospheric germ theory before they could properly employ antiseptic treatment. He had brought this very point before the Society last session, and he held that it was wrong in Mr Lister to say that no one could employ the antiseptic system with success, unless he believed in the theory which Mr Lister believed in. He (Dr W.) did not believe in that theory, and yet he had used carbolic acid nearly as long, and quite as successfully as Mr Lister had. The principle on which he applied it was, as they were aware, a chemical one. In regard to the practical question, they were not to expect equal success in all cases. The treatment is comparatively new, and there must be failures from causes the nature of which they were yet unable to discover.

Dr James Stewart said that of the two theories propounded for the carbolic acid treatment, he was on the whole inclined to give in his adhesion to Dr Watson's chemical theory; but the practical effect of both was the same—viz., to impress on the surgeon the great importance of excluding atmospheric air from the surface of wounds, &c., and the obvious practical tendency of Dr Lindsay's observations was in the same direction.

Dr Lindsay said that his chief object in the remarks which he had made was to enquire whether or not the same influences had been in operation from the earliest times to the present, in securing the decomposition of organic compounds, and whether these influences could be counteracted in surgical disease by the antiseptic treatment. It was immaterial, in a practical point of view, whether the success of that treatment is due to the germ or the chemical theory. If a belief in either of the theories secured the same object, the same results would follow.

FIFTH MEETING, 7th Jan., 1870.—Dr Steven, Vice-President, in the chair.
Dr Robertson read

THE REPORT OF A COMMITTEE OF THE SOCIETY ON THE BRAIN OF AN APHASIC.

(See Page 223 of Journal.)

Dr Robertson remarked that this case, it will be observed, gives support to the view which connects the expression of language with the left hemisphere, and more especially with the frontal lobe of that hemisphere. The symptoms during life were those of nearly pure aphasia. The patient was intelligent; language was in her mind, but *the power of expression* was all but lost. A very interesting feature in this case is the atrophy of the left crus cerebri and same side of the pons Varolii, and of the right side of the medulla oblongata—a condition which, if the brain had been fully dissected, would probably have been found to extend to the thalamus opticus, corpus striatum, and corpora quadrigemima of the left hemisphere. It is evident that the conductors passing to and from the palsied side and the hemisphere are wasted, showing that the central organs of the nervous system are, like other tissues, subject to the general law that, when an organ either partially or completely ceases to discharge the functions with which it was originally endowed, its nutrition is checked, it decays, and is removed. A few cases of similar atrophy of the central nervous system in hemiplegics have been recorded, especially by a German observer, Dr Ludvig Türck, who traced the wasting down the spinal cord, usually in the anterior column of the side affected, and in the lateral column of the opposite side, thus so far corroborating the doctrine held by physiologists of the constitution of the spinal cord and the functions of its columns.

Dr Lyon gave some particulars of a case of aphasia at present under his care.

Dr Weir said that he was convinced that in many cases aphasia was only temporary in its consequences, and therefore not produced by any structural lesion in the brain.

Mr John Reid—Sir Astley Cooper mentions the case of a person who fell from the yard-arm and sustained a depression of the skull. He lost his voice during the whole voyage home, but after trephining and raising the depressed part he immediately spoke.

EXHIBITION OF PATHOLOGICAL SPECIMENS.

1. *Case of uncomplicated tricuspid obstruction.*—*Dr Gairdner* exhibited a heart in which the tricuspid orifice was obstructed by a peculiar pendulous tumour. The preparation was obtained from the case the details of which during life will be found in "*Clinical Medicine*," p. 602.

A Committee of the Society was appointed to examine the heart, and report to a future meeting.

2. *Remarkable case of Cardiac Polypi and Embolism.*—*Dr Steven* exhibited the heart from this case, and read the descriptive paper given at p. 167 of the present number of the *Journal.*

Dr Macleod said, with reference to the surgical aspects of the case, that he had been unable to watch it through its whole course, on account of his absence during his holidays. When he saw the patient in Dr Steven's ward, the foot was cold and beginning to be mottled. He did not see him again for a month, by which time he had been transferred to his own wards. The foot was then only held by dead tendons, and was removed by clipping through the tendons and disarticulation. He slept better after the operation, had less pain, and altogether was improved. The same treatment, in regard to the giving of wine and nourishing food, was continued, as stated by Dr Steven. He was suddenly attacked with dyspnœa one day, and shortly afterwards died. In this case the two noteworthy points were these:—1st, the question of operation; and 2nd, the mode in which the collateral circulation was maintained. He was thoroughly convinced that the proper surgical treatment in this case was non-interference. With regard to the question of the circulation, he was unable to say how it could be maintained unless by the anastomosis of the lumbar vessels.

Dr Hugh Thomson said that he had read of a case in which the circulation was maintained by the internal mammary and the epigastric arteries.

Dr Lyon said that one interesting question had been left untouched, viz., the *rationale* of the formation of this clot. With reference to the question of amputation, he believed that in gangrene the disease was so very frequently constitutional, that after amputation it often reappeared in some other part. As to the possibility of removing a plug in a vessel, he mentioned the case of a female who was suddenly seized with pain in the axilla, followed by loss of sensation and great coldness below the affected point. Pulsation could be traced to the axilla, but not beyond. It was thought possible to remove the obstruction by friction and manipulation; the suggestion was immediately acted on, and with complete success.

Dr Steven was not in a position to speak from his own knowledge of the composition of the clot; but Dr Coats, who had examined it, would do so. Possibly in such cases there had been endocarditis, with roughening of the endocardium, occasioning a tendency to the deposit of fibrin.

Dr Joseph Coats reported that the constitution of the part described as red was quite different from that described as pale amber-coloured. The former on section was seen by the naked eye to consist of a central darker red and a superficial less coloured portion. Under the microscope the central portion was seen to be composed of a mass of blood-corpuscles imbedded in a very close network of a bright red colour, without any regular arrangement. The blood-corpuscles in the meshes of this network presented the size and shape of ordinary red corpuscles, but had lost their red colour. They were also singularly resistent to reagents, dilute acetic acid only making them more distinct, and even glacial acetic acid or pure carbolic acid not completely destroying their contour. The more superficial layer showed a generally pale background, with dark red masses somewhat thickly interspersed, these masses resembling what has been figured as red corpuscles inside cells. Towards the base of the growth, near its junction with the heart, there were abundant connective tissue and granulation-like cells interspersed with the red masses already mentioned. The paler portion of the clot presented to the naked eye on section a generally opaque whitish appearance, with streaks of yellow in the more central parts. On microscopic examination there was in the greater portion merely a transparent granular appearance, with here and there large fibro-plastic cells. The yellow streaks presented an opaque granular appearance. Superficially there were three distinct layers, differing from each other as follows:—First, a layer of cells, having the appearance and size of white blood corpuscles; within this a transparent homogeneous layer, without structure; still more internally a layer of large fibro-plastic cells, with characteristic spindle-shaped nuclei. These appearances suggested gradual formation of the polypus, and also showed a tendency to organisation, replaced in the most central parts by degeneration.

Dr Morton's experience as regards the question of amputation in senile gangrene was much more favourable than that of those who had spoken. He had two cases not long ago, and, as far as the operation was concerned, both were successful. In one of the cases the wound healed with great rapidity, the patient got quite well, and went to the coast, when his health again began to suffer, and on his paying him a visit he was horrified to find that the other leg had died almost entirely, the death not beginning at the toes, and extending upwards, but the whole limb dying at once. The man speedily sank. In the other case a woman's arm had died to a line half way up the arm, and she was suffering intense agony. With little hope of success, he proposed amputation, as affording her the only chance of recovery, scarcely expecting assent to the proposal. It was, however, agreed to. The operation was quite successful, and in a very few days she was sitting up. She was 54 years of age. The other patient was exceedingly dyspeptic and emaciated. There were evidently, however, two classes of cases—one in which it was perfectly hopeless to operate, and another in which amputation may be reasonably expected to afford a chance of life.

Dr Macleod pointed out that the case of embolism, when you are perfectly certain a plug exists in an artery, and where you can exactly lay your finger upon it, was quite different from a case where not the slightest circulation could be detected by the finger, and where, for ought we know, the whole arterial system may be affected.

Medical Intelligence, &c.

GLASGOW MATERNITY HOSPITAL.

Thirty-fifth Annual Report.

During the past year 364 women have been confined in the Hospital, and 790 at their own homes, making a total of 1154 women who have received the benefit of the Institution. The number of children born was 367 in the Hospital and 809 at their mothers' homes. The maternal deaths in the Hospital were 7, and out-door 4.

CAUSES OF MATERNAL DEATHS.

Of the seven women who died in Hospital—
1 died from Phlebitis (phlegmasia dolens ?)
1 „ „ Rupture of uterus.
1 „ „ Phthisis.
1 „ „ Peritonitis.
1 „ „ Metritis, complicated with Bronchitis.
1 „ „ Convulsions.
1 „ suddenly, exact cause not disclosed by *post mortem* inspection.
Total, 7

Of the four deaths which occurred out of Hospital—
2 died from Puerperal peritonitis.
1 „ „ Exhaustion (placenta prævia).
1 „ „ Post partum hæmorrhage.
Total, 4

It may be mentioned that the present Report, as compared with that of last year, exhibits an increase of 207 in the number of patients; of these 18 were in-door, and 189 out-door cases. The number of cases treated at the Dispensary within the period embraced by this Report was 824, being an increase of 464 over that of last year.

The attending physicians feel gratified at being again able to report favourably in regard to the healthy condition of the Hospital. There was very little illness among the patients, and the recoveries were generally rapid and complete. The physicians, deeply impressed with the importance of maintaining the wards in a salubrious state, have bestowed much care and attention in endeavouring to improve the sanitary and hygienic condition of the Hospital. The means adopted for keeping the Hospital in a healthy condition were thorough cleanliness, perfect ventilation, daily fumigation by carbolic acid, prevention of overcrowding, &c. It can scarcely be doubted that the healthiness of the patients was in no small degree due to the systematic and rigid observance of those measures.

As a school for clinical and practical instruction in obstetric medicine it has proved a most invaluable Institution. Numerous students annually receive, under the supervision of the physicians, a thorough course of instruction in practical midwifery. Although the Dispensary affords an excellent field for the study of diseases in general, yet it must be admitted that the patients resorting thither for advice were, with few exceptions, not of that class for whose *exclusive* benefit the Dispensary was instituted. A course of practical instruction is regularly conducted for the purpose of qualifying respectable females to discharge the duties of ladies' nurses and midwives.

KILMARNOCK FEVER HOSPITAL ANNUAL REPORT.

Thirteen months have now elapsed since the Kilmarnock Fever Hospital and Infirmary was opened, and during that period 101 patients have been admitted. Of these 70 have been cured, 6 discharged improved, 7 died, and 18 remain. There have been only 7 deaths, 3 from fever, 2 from consumption, 1 from disease of the knee joint, and 1 from disease of the ankle joint. Of the 3 cases of fever which proved fatal, two were labouring under disease of the lungs previous to taking fever, and the other was an old woman nearly 70 years of age. Of the two cases of consumption, one of them lived only four days, and the other twenty-eight. With the limited experience of the year now past, it is abundantly apparent that the Institution has had an important and lasting effect in checking the spread of contagious diseases. In no single instance after the removal of a fever patient to the Hospital have any of the other members of the family taken the disease.

A tabular view of diseases treated is appended, the classification of which seems rather rude, especially in the class of disease regarding which we look for lucid ideas in a *Fever* Hospital Report. We find "Fever, *mostly* Typhoid and Typhus." Of the total 101 cases treated, 48 are so classified.

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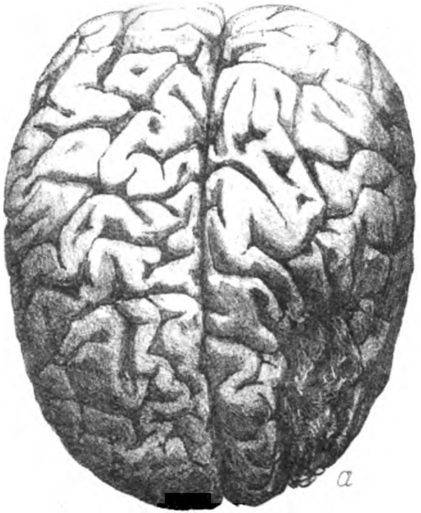


FIG. A

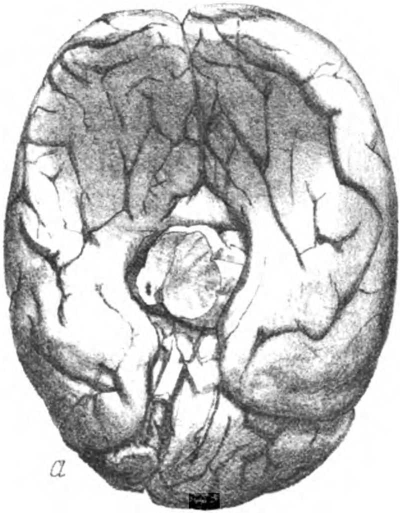


FIG. B

BRAIN OF APHASIC
Dr ROBERTSONS CASE

DESCRIPTION OF PLATE

To illustrate "Report of a Committee of the Medico-Chirurgical Society of Glasgow on the Brain of an Aphasic."—(p. 223, February.)

Fig. A.—*Upper Surface of Brain*, showing the atrophied area *(a)*, and exhibiting the disproportion of the two hemispheres.

Fig. B.—*Under Surface of Brain.*—The cerebellum has been removed, so as to exhibit the disproportion between the two crura, and the position of the grey degeneration in the left crus. The extension of the frontal atrophy to the inferior surface is seen at *(a)*.

N.B.—The slight distortion of the brain referred to in the Report (p. 223) has been faithfully rendered by the artist, as correction of the defect might have impaired the truthfulness of the delineation. J. YOUNG.

THE

GLASGOW MEDICAL JOURNAL.

May, 1870.

Original Articles.

I.—THE FORCES WHICH CARRY ON THE CIRCULATION OF THE BLOOD.

By ANDREW BUCHANAN, M.D., *Professor of Physiology in the University of Glasgow.*

NO. III.—THE PNEUMATIC FORCES.

SECTION 1ST.

GENERAL PRINCIPLES—(CONTINUED).

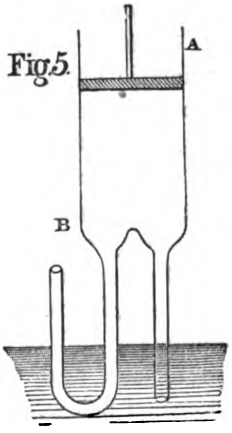
HAVING now shown that it is in perfect accordance with the laws of physics to suppose that the weight of the atmosphere pressing upon the external surface of the blood-vessels should be an auxiliary force in carrying on the circulation of the blood, we proceed to point out the pneumatic forces by which this object is effected, the physical principles upon which their action depends, and the physiological phenomena which attest their influence over the circulation of the blood.

Pneumatic Forces Enumerated.—The pneumatic forces we have to consider are those of the chest, of the heart, and of the arteries, and the force of a complex apparatus, to which we give the name of pleuro-cardiac. The forces of the heart and of the arteries are the most widely diffused throughout the animal kingdom. They seem to be modifications and a higher development of the force of the pulsatile vessels, more allied to veins than to arteries, which exist in animals destitute of a heart. The force of the chest exists in its most perfect state in mammalians and birds, in which it is the most powerful auxiliary to the propulsive force of the heart in carrying on the circulation of the blood; and for that reason we shall speak of it in the first place.

Pneumatic Force of Chest.—All the pneumatic forces depend on the alternate amplification and contraction of a hollow organ, to the interior cavity of which the blood has free access, and is forced into the enlarging cavity by the pressure of the atmosphere. It is unnecessary to describe the cavity of the chest, or the complicated muscular action by which it is amplified. Nearly the whole venous blood of the body flows into it on its way to the heart—which, with the great veins leading towards it, and the whole blood-vessels of the pulmonary circuit, are situated entirely within the cavity. No doubt could be entertained that when the chest enlarged the blood must be forced into it by the atmospheric pressure, were it not that the chest is not accessible to blood alone, but has also a free communication with the external air which unquestionably rushes into it as soon as it begins to enlarge, and continues to do so till it is fully expanded. What, then, are the physical principles which come into play when a liquid and an aërial fluid have both free access to the same expanding cavity? It is under these conditions that the chest expands in inspiration; but the physical principles involved will be better understood by considering them in the first instance with reference to a more simple pneumatic apparatus.

Dr Arnott's "bloodless experiment" to disprove it.—The apparatus we have first to speak of differs very much from the respiratory apparatus, but we must consider it in order to obviate an objection of Dr Arnott's which he makes specially against the pneumatic agency of the chest, as he did the objection already spoken of against pneumatic agency in all its forms.

Fig. 5.



Let A B be a syringe having two pipes attached to its cylindrical part, by one of which the air has free access, while the other has its lower end immersed in water. On raising the piston slowly, air only will enter the cylinder. But if the piston be raised rapidly, and more especially if the air be impeded in its passage through the air tube, there will be an agitation of the surface of the water, and a temporary rise of it in the water-tube till the air gradually enters, when the water subsides to its original level.

This is exactly the "bloodless experiment" of Dr Arnott,—so named by him in contradistinction to Barry's sanguinary experiments,—on which he relies to overturn the doctrine of the pneumatic force of the chest; but it is quite beside the mark, having in reality no connection with that doctrine as stated below. If a person holds a glass tube in his mouth while the other end is immersed in water, and then makes an inspiration through the nostrils, it is obvious that the tube and the nostrils correspond to the water and air-pipes in the above apparatus, while the diaphragm plays the part of the piston. The result is exactly the same, depending on the degree of obstruction of the air-tube. "In tranquil breathing with both nostrils, the fluctuation in the tube is," according to Dr Arnott, "less than half-an-inch either way; with one nostril closed, and the other a little compressed, it may amount to a whole inch; and in convulsive breathing it may exceed twelve inches." Hence, Dr Arnott considers, "that an inch column of blood is the measure of the greatest sugescent power of the chest, and that the heart has to lift a column of blood an inch longer during inspiration and an inch shorter during expiration." I agree fully with Dr Arnott that if the doctrine of the pneumatic power of the chest had no other foundation than this, it should be at once abandoned.

Cavity of Chest—divided into Pulmonary and Circum-Pulmonary Cavities.—The cavity of the chest, considered as a pneumatic apparatus, is divided into two distinct cavities, separated from each other by the mucous membrane of the lungs. Into one of these cavities air alone enters: while into the other the blood enters, but no air is allowed to penetrate in normal circumstances; and when it does penetrate, from injury or disease, it impedes or arrests the pneumatic operation. As this is a fundamental distinction in our whole argument, I give to these two cavities the names of the pulmonary and circum-pulmonary cavities, corresponding to the air-sac and water-chamber in the typical apparatus described below.

The pulmonary cavity contains air only, and upon inspiration it is blown up like a bladder, which is the simple form of the lung in the serpent tribe; while in the higher animals the bladder is subdivided by dissepiments into smaller cavities, all communicating with each other. But as these subdivisions serve only certain subordinate purposes, the simple bladder shape is the best fitted to illustrate our argument.

The circum-pulmonary cavity intervenes between the ribs and diaphragm on the one hand, and the mucous membrane of the lungs on the other. It is also subdivided, for certain important secondary purposes, into several cavities—the two cavities of the pleura, the cavity of the pericardium, and the cavity of the heart and blood-vessels. These cavities are separated by pliant membrânes, and stand exactly in the same mutual physical relations to the pulmonary cavity. We shall therefore regard them as constituting only a single circum-pulmonary cavity, for whatever can be proved of the general cavity can be proved also of any of its subdivisions individually.

Typical Apparatus, or Respiratory Pump; divided like Chest into Air-Sac and Water-Chamber.—We modify our apparatus in conformity with the description just given, in order to illustrate the physical conditions under which, on the amplification of the thorax, air rushes into the pulmonary cavity, and blood simultaneously into the circum-pulmonary cavity. We represent (Figs. 6 and 9), therefore, the cavity of the thorax or chest by a glass vessel which admits of being amplified and again contracted by a piston or diaphragm. The interior of the vessel is divided into two parts by an elastic membrane in the form of a sac with an exterior opening, through which the air rushes and distends the sac on raising the piston. This air-sac corresponds to the pulmonary cavity. The other division of the vessel, or water-chamber, corresponds to the circum-pulmonary cavity. It is prolonged downward (Fig. 6), horizontally (Fig. 9), or upward, and terminates in a vessel of water by an open orifice, through which the water enters on raising the piston.

We have thus reduced the problem to be solved to its simplest terms, and we have now to inquire what are the physical laws which the air and water must obey on alternately elevating and depressing the piston.

In the first place, it is obvious that if the water-tube be stopped by a cork, and the piston be alternately raised and depressed, we have then an exact representation of the play of the lungs; for the air-sac is gradually distended as the piston ascends, and collapses as it descends. There is, indeed, this difference, that the surface of the lungs is always in immediate contact with the walls of the chest,—while in our apparatus there is some air between the sac and the sides of the cylinder; but this serves to render the movements of the parts more conspicuous, and in no way interferes with the accuracy of the representation. We have, indeed, only to suppose the intervening air to be a light, solid substance, perfectly elastic, and so pliant as to adapt itself to the altering shape of the cavity, and we have the surface of the air-sac in immediate contact with this substance, just as the surface of the lungs is in contact with the expanding walls of the chest.

Pump destitute of valves; draws in water but does not expel it.—If now the water-tube be left open, the apparatus becomes a pump of a peculiar structure, admirably adapted to the purposes it is intended to serve in the living economy. In the first place, it has no valves, which are essential to the operation of a common pump. But it is obvious that the interposition of valves where the great veins enter the chest would have been disadvantageous to the circulation; for whenever these valves were shut, they would have been a barrier to the current of venous blood, destroying whatever power that current has in dilating the cavities of the right side of the heart; just as the valves upon the right side of the heart destroy that power altogether, and so prevent the influence it would otherwise have in filling the pulmonary vessels. In the second place, the respiratory pump, (as I shall name it), while it draws in liquid to its cavity during the ascent of the piston, does not expel it during the descent of the piston,—the expulsive force telling solely upon the air in the air-sac, and not affecting the liquid in the water-chamber. A common pump, deprived of its valves, becomes a mere syringe, in which, whatever quantity of liquid be drawn in during the ascent of the piston, it is again expelled as the piston descends. The peculiarity of our apparatus is, that although destitute of valves, and drawing in liquid like a syringe during the ascent of the piston, it does not, if properly worked, expel the liquid as the piston descends. Just so the act of inspiration draws blood into the chest, while the act of expiration, in all ordinary circumstances, has no power to expel it. This obviates what has always been considered the most formidable objection to the pneumatic agency of the chest upon the circulating blood.

Action depends on membrane of sac—elasticity—weight and position.—The peculiar action of the respiratory pump, to which it owes its utility, depends upon the properties of the membrane forming the air-sac,—that is to say, surrounding the pulmonary cavity and separating it from the circumpulmonary. These properties are of two kinds. In the first place, it must oppose a certain resistance to the entrance of the air by which the sac is distended; for that resistance is at once the source and the exact measure of the force with which the liquid is drawn into the water-chamber or circumpulmonary cavity.

In the second place, the membrane forming the sac must have an inherent power of emptying the sac of the air by which it has been distended as soon as the distending force ceases to act, and without the assistance of any extrinsic force. By an inherent power of the membrane, I mean a power depending upon its inherent properties; and of these I know only two to which such an expulsive power could be referred, viz., elasticity and gravity, assisted by a fitting position of the sac.

When a caoutchouc bag is inflated, if the orifice by which the air has been blown in is not immediately stopped, the elasticity of the bag immediately expels the air, at first with great force, and then with a force gradually decreasing till the bag is nearly empty. Now the tissues of the lungs, or those forming the trachea, the bronchial tubes, and the pulmonary cells, are all of them eminently elastic, and are therefore fitted, when the lungs have been inflated, to expel the air from them without the aid of any extrinsic force; that is to say, by their own inherent power, just like the membrane of a caoutchouc bag in similar circumstances.

Provision of nature to augment elasticity.—Here it is impossible not to advert to two beautiful arrangements by which nature intensifies this elastic force of the lungs, so as to avail herself of it to the highest possible degree. The first is, that the lungs in ordinary breathing only expel one-eighth part of their total contents. Now, just as in the caoutchouc bag, the elasticity of the lungs is greatest when the first portion of the air is expelled from them, and would have become gradually weaker had the expulsion proceeded farther. The second arrangement is the great extent given to the elastic tissue of the lungs by the multiplication of cells and minute cylinders, instead of a simple sac, as in the serpent. Now, the elasticity is in proportion to the extent of the elastic tissue. One thousand pulmonary cells have ten times more extent of tissue, and ten times more expulsive force, than a single sac having the same cubic content.

When the air-sac is formed of a thick, dense tissue, like that of a foot-ball, if the sac be properly placed, with the orifice downmost, the weight of the sac will co-operate with its elasticity in expelling the air after inflation; while, in less favourable positions, the weight of the sac might be a great impediment to the expulsion of the air. This was at first a difficulty in constructing a working model of the respiratory pump; but the most essential condition to be observed is to follow nature in not permitting the expulsion of the air to be carried too far, but restricting the quantity of air expelled at each respiration to a small fraction of the whole amount, as explained above. The weight of the lungs, from the vast network of blood-vessels they contain, and the quantity of blood contained in them, must be very considerable; but, in whatever position the body is placed—upright, supine, prone, or on the side—it seems to contribute to the expulsion of the inhaled air.

To resume, then:—The utility and special action of our apparatus depends mainly on the properties of the membrane forming the air-sac, in virtue of which it first opposes the entrance of air into the sac, and again immediately expels it on the distending force ceasing to operate. To explain its mode of action in detail, we must consider separately three different cases; in which the action of the apparatus varies according as the water enters the water-chamber from the same level, or from a higher or a lower level.

Action of Pump Modified by Level of Inhaled Water.—The blood entering the chest may be considered as virtually, in all normal circumstances, coming from a higher level of about nine inches; for we have found a column of blood of that height to be the measure of the force of the heart remaining at the end of the jugular vein, and we have found that such a force is indispensable to the action of a pneumatic force on flaccescent tubes. The only use of a pump in such circumstances must be to accelerate the entrance of the blood. If, again, the liquid were to come from the same level, which would be nearly the case in the veins without and within the chest, if we made no account of the remaining impulse derived from the heart, and as actually occurs when the force of the heart is very feeble, or arrested in a fainting fit—then the liquid would have no tendency to enter but for the action of the pump. In neither of these cases would the descent of the piston be followed by any retrogressive movement of the inhaled liquid. But, on the contrary, if the liquid comes from a lower level, while it is drawn in during the ascent of the piston, it flows out during the descent—not from any force exerted by the piston, but simply from its own gravity. This case, although resembling least what occurs in nature, we shall nevertheless consider chiefly as being best adapted to illustrate the physical action of the apparatus, and still more as supplying us with an accurate measure of the inhaling power of the apparatus at every stage of the dilatation of the sac.

Water from below—Vertical Tube of uniform diameter.—When the liquid enters the instrument from a lower level, the phenomena which present themselves on working the piston are different according as the water-chamber has the form of a tube of uniform area (Fig. 6), or has a wider area above than at the orifice (Figs. 7, 8). To take first the simpler case, in which the water-tube is of uniform area (Fig. 6):—On elevating the piston, not only will the air-sac be distended, but the water will rise in the water-tube to a definite level, at which it will remain as long as the piston is kept elevated.

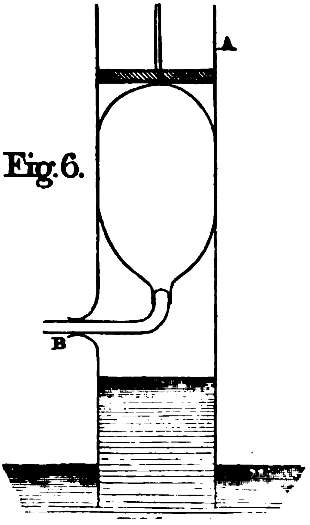


Fig. 6.

The explanation of these phenomena is simple. The air no longer rushes into the sac with the same force with which it rushed into the empty syringe (Fig. 5); for a certain part of the force has to be expended in distending the sac. It is manifest that when the sac is in a state of collapse, a certain force is required to overcome its elasticity if it have any, or at all events its inertia by which it resists distention. But on raising the piston the water is forced into the tube with the whole force of the atmosphere, and it must rise in the tube till equilibrium be produced, and that will obviously happen when the weight of the column of water is just equal to the resistency of the air sac. This is manifest from considering that the elasticity of the air included in the cylinder together with the resistency of the bladder is just equal to the atmospheric pressure; and the elasticity of the included air together with the weight of the column of water in the water-tube is also equal to the atmospheric pressure. Whence on equal areas the resistency of the bladder or elastic sac is just equal to the weight of the column of water in the water-tube. If, for instance, the included air were rarified to one half, and the apparatus were sufficiently capacious, then the water in the water-tube would stand at the height of 16 feet, and the force with which every square inch of the sac resisted further distention would be equal to 7½ pounds.

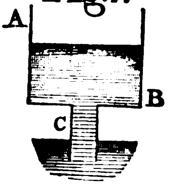
It may be here remarked that we could in this way measure the resistency of the lungs; which must depend partly on the elasticity of the pulmonary tissues, but a great deal also on mere inertia, since the pulmonary vessels filled with blood are ramified upon the surface and throughout the substance of the lungs.

Lastly, when the piston descends, the column of water falls in the water-tube, just as the sac is emptied of air by its own expulsive power; the height of the diminishing column of water being always an exact index of the degree of resistency of the sac.

It is worthy of remark, as illustrating more fully the principles on which the instrument works, that if instead of a piston, which always occasions a certain amount of resistence from friction, we employ a diaphragm, then no sooner does the hand bearing up the diaphragm let go its hold than the diaphragm spontaneously descends, for the pressure of the atmospheric air above it is greater than that of the rarified air in the cylinder supporting it below. But no sooner is the equilibrium disturbed between the air in the cylinder and that in the air-sac, than the elasticity and weight of the membrane of the sac comes into play, and expels the air which it contains, and all this goes on till the air in the cylinder at length becomes of the same density as the external air, when equilibrium is again re-established as at first. The diaphragm is now again raised, and the air-sac is filled; on removing the hand it is again emptied without the aid of any extrinsic force, so that the air within the cylinder never becomes more dense than that without, and can never therefore exert an expulsive force upon any liquid that may have entered it from the same or from a higher level.

Vertical tube wider above than below.—Let us now consider the second case (Figs. 7, 8), in which the vertical tube is wider above than below. When the water-tube is of uniform area there is complete harmony in the movements of the air and the water, both during the ascent and the descent of the piston; the air rushes into and is again expelled from the air-sac just as the water rises and falls in the water-tube, for the weight of the column of water always keeps equal to the resistency of the sac. But this harmony is at once destroyed if we make use of a tube which is wider above than it is below, and the effect is, if we may so speak, to give to the water complete precedence over the air.

Fig. 7.



Let the tube A B C become at the point B thrice or any number of times greater in diameter, so that the upper half of it has nine times the area of the lower. Then, other arrangements as before, when the piston is raised the water will rise in the lower part of the tube, as explained above; but as soon as it reaches the upper and wider part of the tube its progress upward is retarded, for it rises in the upper part of the tube nine times more slowly than in the lower.

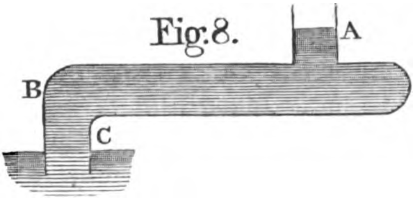
But we have seen that the dilatation of the air-sac goes on *pari passu* with the rise of the liquid in the lower tube, and therefore nine times faster than the rise of the liquid in the enlarged tube. Hence the air-sac is rapidly distended to the uttermost. But there is here no equilibrium, and such a state of matters cannot last, seeing there is an inequality between the column of water and the resistency of the air-sac, and there only can be equilibrium when each of these, added to the elasticity of the air included in the cylinder, is equal to the pressure of the external air. The consequence is, that if the piston be kept elevated the water slowly rises in the water-tube, and the air-sac slowly contracts until at length equilibrium is produced; and the water will only attain its full height, corresponding to the full distension of the sac, after several short movements of the piston upward.

The effect of the descent of the piston is equally remarkable. The contraction of the air-sac goes on with the same rapidity with which the water would have descended in a tube of uniform area; but in the wide tube it descends nine times more slowly. Hence the air-sac rapidly collapses, while a large proportion of the water is still within the large part of the tube; and if the piston continues in constant motion upward and downward, in accordance with the state of the air-sac alone, so long will the water remain included in the larger tube oscillating upward and downward within limits which are determined by the rapidity of the movement of the piston.

If, after the collapse of the air-sac, the piston were forced still farther downward, the whole of the water, both in the large and in the small tube, would be expelled, and on again raising the piston, the same series of phenomena would be repeated from the beginning. But if, after the water has once accumulated within the tube, the motion of the piston be limited, like that of the ribs and diaphragm in expiration, to the mere expulsion of a small proportion of the air from the sac, then will the liquid remain permanently accumulated within the tube.

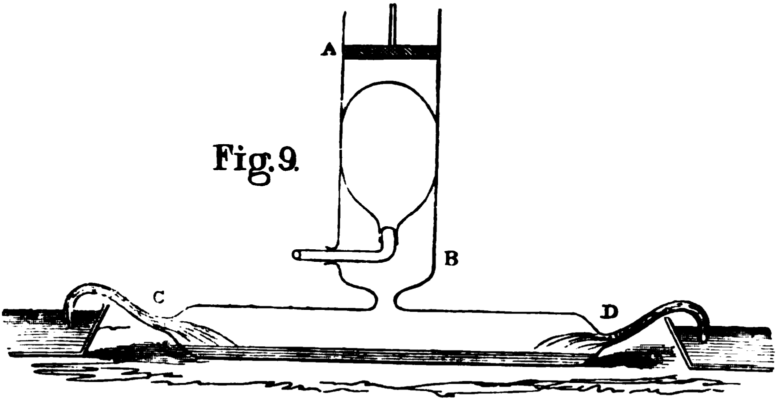
It is obvious that the greater the increase of area of the wider part of the tube, the greater will be the accumulation of liquid; and if the cylinder, instead of being vertical, be placed horizontally, then the length of the horizontal part of the cylinder may be made to represent the increase of area, and the accumulation within the cylinder will be proportionally great.

Fig. 8.



Water from same level.—We have hitherto supposed the level of the water inhaled to be below the water-chamber; but if the water-chamber and the water to be inhaled are on the same horizontal level (Fig. 9.), as is literally the case with the chest when we are recumbent, in respect to the great veins penetrating into it, then it is obvious, first, that the force of gravity is no longer an obstacle to the influx of liquid into the water-chamber; and second, that when the force which caused at once the dilatation of the air-sac, and the influx of water ceases to operate, then the air alone will be expelled by the spontaneous contraction of the air-sac, while there is not the slightest retrogressive movement of the inhaled water. Gravity was the sole cause of the efflux of the water from the vertical tube, but that cause no

Fig. 9.



longer operates at a horizontal level. It is exactly in this way that air alone is expelled from the lungs by an ordinary expiration, without any refluent movement of the blood. Farther, if the influent liquid, instead of being allowed to spread itself freely throughout the horizontal chamber C D, be received into a bit of gut, or large vein, it will distend the gut or vein as it flows in, just as the influent blood does the venæ cavæ during inspiration.

Water from above.—Lastly, if the inhaled water, instead of coming from a vessel on the same level as the water-chamber, come from a vessel placed 9.45 inches above it, then upon raising the piston will the water be forced into the water-chamber, not merely by the pressure of the atmosphere, but also by the pressure of a column of water 9.45 inches in height. Exactly in this way is the blood upon inspiration forced into the venæ cavæ and cavities of the right side of the heart, not only by the pressure of the atmosphere, but by the pressure of a column of blood of the weight just indicated. This same force would distend also the pulmonary vessels, both arteries and veins, and the cavities of the left side of the heart, did not the valves and contraction of the right side of the heart form a complete barrier to its further extension.

It is scarcely necessary to repeat that the whole phenomena we have described as taking place in rigid tubes would take place also in veins or other flaccessent tubes under the pressure of a column of liquid of the height just mentioned, or under the influence of an equivalent vis a tergo or propulsive force from behind.

Action of Typical Apparatus compared with that of Chest.—To conclude this part of our argument. The very same principles of physics which regulate the entrance and expulsion of air and liquid in the simple apparatus we have been describing, regulate also the entrance and expulsion of air and liquid in the cavity of the chest. To speak more precisely, the movement of the piston denotes the movement of the diaphragm and ribs; the air-sac represents the pulmonary cavity, or that bounded by the mucous membrane of the lungs; the water-chamber corresponds to the whole space which we have named the circum-pulmonary cavity, or that intervening between the lungs and the parietes of the chest, together with the mediastinum or space intervening between the lungs, and stretching the whole length of the thorax from the spine to the breast-bone. The anatomist, deriving his ideas from the dead body as he sees it on dissection, speaks of the two cavities of the pleura, and that of the pericardium; but such cavities are unknown in the living body, for both the lungs and the heart have a serous membrane surrounding and in immediate contact with them to facilitate their movements by the secretion with which they are lubricated. The only part of the circum-pulmonary space which is accessible to blood consists of the great systemic veins, the cavities of the right side of the heart, the pulmonary vessels, arteries, and veins, and the cavities of the left side of the heart. At birth, and for a brief period thereafter, the whole of this irregular and far-stretching cavity is not only accessible to blood, but has the blood forced into it by the pressure of the atmosphere; but in the adult, as has been shown above, the right side of the heart forms a barrier to the atmospheric pressure, which does not extend therefore to the pulmonary vessels and left cavities of the heart. The blood rushes into and distends the veins and the right side of the heart upon the descent of the diaphragm and expansion of the ribs at the very same time, and from the same cause that the air rushes into and distends the lungs. The entrance of the blood and of the air into the chest is due to the very same physical laws, according to which, on raising the piston in the respiratory pump, the air rushes into and distends the air-sac, and the water rushes into the water-chamber. When, again, the inspiratory effort ceases, and the chest returns to its former size, the air is at once expelled by the physical contraction of the tissue of the lungs, and of the parietes of the thorax and parts around it; but there is no expulsion of the inhaled blood which remains permanently within the chest, providing a plentiful supply for the gaping cavities of the heart. Not otherwise in our apparatus, when the piston, on the cessation of the elevating force, is allowed to descend, the air-sac expels the air by its own contractile power; but there is no retrogressive movement of the water in the water-chamber. Lastly, both in the natural and artificial apparatus, the retention of the liquid within the cavity is effected without the aid of valves, which, had they been placed at the entrance of the great veins into the chest, would have formed an obstacle to the propulsive force of the left ventricle extending into the chest, and required there constantly to assist in the distension of the right cavities of the heart.

Diagrams and Working Model.—With respect to the *Figures* in various places accompanying the text, it is proper to state that only one of them (Fig. 3), represents an apparatus actually constructed and practically tested, so that the propositions it is intended to prove rest on experimental evidence. All the rest are mere diagrams like the figures accompanying the propositions in a mathematical work, and answering a similar end, for they are all intended to represent to the eye the physical conditions under consideration, and so indicate them to the mind with more precision than mere words could effect. The propositions themselves were originally drawn up in the old style of Borelli, but when I began to think of making them public, I felt that such a mode of treating the subject was altogether abhorrent from the taste of the present day, and I therefore gave to them a lighter form. But this does not in any way alter the nature of the evidence on which they rest, which is purely demonstrative, though without the formality of reference to acknowledged principles. To those who have the patience to study them as mere physico-mathematical theorems they will give an assurance of certainty to the conclusions deduced from them which no other evidence could impart.

But it is always desirable to confirm theoretical deductions by experiment, and there are many men to whose minds the evidence of experiment is more conclusive than any other. I have therefore been at much pains in devising a working model of the "Respiratory Pump," as I name the apparatus by which the respiration and circulation of the blood are simultaneously maintained, and have taken advantage, in the construction of it, of most of the principles indicated above. Inspiration is effected by a diaphragm working upward in a large glass cylinder. Expiration takes place by the spontaneous descent of the diaphragm. The elastic air-sac can be so adjusted as to expel at every respiration only a small portion of its total contents, and so keep up its elastic force at the highest rate. The sac is placed vertically, and opens downwards, so as to make the forces of gravity and elasticity co-operate in expelling the air from the sac. Advantage has also been taken of the harmony with which the elastic air-sac and a vertical water-tube of uniform diameter work together; and both are introduced into the apparatus, as the latter does not interfere with the action of the former, and gives the great advantage of allowing the inhaled liquid to run off by gravity, and so preventing its accumulation in the water-chamber. In this way a continuous current through the apparatus is maintained, the liquid rushing in at each inspiration, never exhibiting any retrogressive tendency during expiration, and being discharged solely by its own weight.*

Pneumatic force of the heart and of the arteries.—The physical principles on which the pneumatic force of the heart and of the arteries depends, are exactly the same as those by means of which we fill with water a caoutchouc bag having a tubulated aperture, by merely immersing the nozzle of the tube in the liquid, after having compressed the bag with the hand, so as to expel the air contained in it. Exactly in the same way, by the alternate contraction and relaxation of the hand, we work the various kinds of injecting apparatus, which in their mechanism exactly resemble the ventricles of the heart, as they consist of a bag of elastic tissue which contracts by the muscular force of the hand, and then returns to its former size, in virtue of its elasticity, as soon as the pressure is intermitted,—while it is provided with two valves to direct the current of liquid, one of them opening inward, and so resembling the auriculo-ventricular valves, and the other opening outward like the sigmoid valves at the root of the great arterial trunks.

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* The apparatus described above was constructed for me by Mr. J. White, 78 Union Street, *Philosophical Instrument Maker to the University of Glasgow*, who has kindly consented to show it in operation to those curious in such matters.

It is manifest that a pneumatic force such as we have described must exist necessarily, and operate in every hollow organ filled and freely supplied with liquid, in which a muscular and an elastic tissue are combined together and antagonize each other, provided the apparatus be subject to the pressure of the atmosphere. It only remains, therefore, to inquire whether this is the structure of the heart and of the arteries.

That such is the structure of the arteries is known certainly; and there can therefore be no doubt that the atmospheric pressure assists in keeping the arteries full of blood when they expand, after having been contracted by their muscular power; but we have already seen that there is no provision of valves, nor any rhythmic succession of movements, by which the muscular power of the arteries could be rendered effective in carrying on the circulation of the blood.

As to the heart, it seems to me impossible to deduce the existence of any expansive force resident in its walls from the recognised properties of the tissues of which they consist, as we see them after death,—and it is an improbable hypothesis that the heart possesses during life an elasticity which no other muscular tissue is known to be endowed with. How, then, are we to explain the unequivocal indications which the heart of a living animal exhibits of spontaneous dilatation? The heart of an animal tenacious of life beats, often for whole days, after being separated from the body, constantly resuming its natural shape in the intervals between the contractions. Every one who has witnessed the action of the heart in a living animal, and laid hold of it, must have been struck with the great distension of its cavities, which swell out firmly in the hand that supports them. Haller and Magendie both declare that it is impossible to prevent the dilatation of the heart, even of a small animal, by the pressure of both hands.

It appears to me most probable that the expansive power of the heart resides not in its walls, but in the transverse septum which separates the auricles from the ventricles, and gives to the organ its contour at its thickest part. This septum, usually called the base of the ventricles, is made up of fibrous and fibro-cartilaginous tissue intermixed with muscular fibres. It exhibits four apertures, the two inlets and the two outlets of the ventricles,—usually called the auriculo-ventricular and arterial orifices. These apertures are always patent when the heart is quiescent, as we see it after death. The two inlets are never more distended, but admit of complete contraction; the two outlets are never more contracted, but admit of farther distension. The whole four exhibit constant movements which are exactly synchronous, but the inlets and outlets are in a state of complete antagonism, the one shutting and remaining shut at the exact time when the other opens and remains open. The same mechanism, indeed, to a certain extent, produces these opposite effects. Thus the inlets are shut by the contracting fibres of the ventricles just at the moment when the stream of blood issuing from the ventricles distends the outlets. But the most interesting of the whole phenomena is the immediate starting open of the two inlets, or auriculo-ventricular orifices, as soon as the relaxing fibres of the ventricles cease to retain them. This seems to be due to the whole transverse septum resuming its ordinary diameter and shape, after being condensed and bent downwards at the circumference by the force of the ventricles in their contraction. But the opening of the auriculo-ventricular orifice extends the base of the ventricle, and so gives a corresponding widening to the whole conical cavity. The consequence is that the blood, which has always free access to the auricles, and with which the auricles are now distended, makes its way into the ventricles also and distends them, not only with a like force, which we have found upon the right side to be equal to

5·453 oz. upon every square inch of surface, but also with whatever force may result from the active dilatation of the auriculo-ventricular orifices.

The apparatus attached to the inlet of the ventricles, and usually named the "auriculo-ventricular valves," has a totally different structure from the sigmoid valves, or any other valves, whether in the sanguiferous or the lymphatic system. All of these valves have a free margin, and are shut by the mere force of the refluent liquid. In this apparatus alone the free margin of the tendinous expansion surrounding the inlet is tied down by tendinous cords to the inner surface of the ventricle, in such a manner as to prevent all movement of it backwards when the cords are on the stretch; and by pulling them firmly downwards they shut the inlet, acting exactly like purse-strings in shutting the mouth of a purse. The whole apparatus, comprehending the tendinous membrane, the cords, and the projecting fleshy columns to which the cords are attached, appears to me to constitute a sphincter, intended for the complete occlusion of the aperture between the auricles and the ventricles; and to work most probably in the following way. The aperture, which is wide open when the auricles are full, is gradually narrowed during the contraction of the auricles, and reduced to a very small size as the last portion of blood is forced through it into the ventricle. The tendon is now in the most favourable position to admit of the lengthening of its tendinous cords, which are drawn downward by the elongation of the distended ventricle. But no sooner does the ventricle begin to contract, than the tendinous cords are more forcibly stretched by the shortening of the fleshy columns, from the ends of which they arise. The whole tendon is thus drawn downward, and the aperture closed and maintained in the state of occlusion till the end of the systole. No sooner, however, do the muscular fibres of the ventricle cease to act, than the tendinous cords are relaxed, and the elasticity of the sides of the aperture restore it from the constrained position into which it had been drawn to its original patency.

The action of the tendinous cords, in shutting the aperture, is well seen in the heart of the ox, by opening the left ventricle from below, and passing a string all round between the tendinous cords and the walls of the ventricle. Upon now pulling the string downward, the whole cords are simultaneously stretched, and on looking to the ventricle from above, the orifice will be seen accurately closed, the tendinous membrane adapting itself thereto by numerous folds, with intervening digitations, exactly resembling the folds and projecting digitations of the skin around any other sphincter in a state of occlusion. This is much better seen in the circular aperture on the left side than in the elongated and less regular opening upon the right.

It may be farther argued that the diminution of the transverse diameter of the heart, which takes place during the systole, as it cannot be owing to the state of the outlets which are then fully distended, must be referred to the collapse of the inlets.

Neither is the valve hypothesis without its difficulties. In Fig. 229, *Quain's Anatomy*, (Vol. I., p. 305), the valves are shewn with the segments distended as they are believed to be during the systole. Each of the orifices is expanded to the uttermost, with the valve like a ship under sail coming through into the auricle, and only prevented from doing so by the tendinous cords, to which this sole office is assigned. But if this expanded state of the base of the ventricle continue during the whole time of the systole, how can the conical cavity be emptied of its blood, which accumulates in greatest quantity just at the base?

The whole subject of the action of the heart seems to me to require revision. It has been regarded too much as the action of two distinct organs in a state of antagonism to each other, and not as the rhythmical action of a single organ,—the several parts of which assume in succession the states of distension, contraction, and moderate dilatation, which, after a pause, passes into distention again. In the simple dorsal vein we see these changes commence behind, and pass forward through every part of the vein in succession;

and not otherwise, in the more complex apparatus of the higher animals we have these same changes occurring first in the great veins entering the auricle, next in the auricle itself, then probably in the inlet to the ventricle, next in the ventricle itself, and lastly in the outlet and, where it exists, in the bulbus arteriosus.

Pleuro-cardiac force.—But the most important aspect under which we can contemplate the pneumatic action of the heart is, when we regard the heart as the centre of a pneumatic system to the dilative force of which it contributes nothing, while it regulates the whole working of the system within the limits which the dilative force will permit. An idea of such a system will at once be formed if we suppose the air to be extracted from a pericardium made of glass, and the heart to be supplied by rigid tubes with blood subject to the atmospheric pressure. Then, every time the heart contracted in the vacuum of the pericardium, its cavities would be again distended forcibly by the blood impelled into it by the atmospheric pressure, and the oftener the heart contracted, the more blood would be forced into it and again expelled, the only limit being those determined by the degree of exhaustion of the air in the pericardium and the working capabilities of the mechanism of the heart.

Such, virtually, is the position of the right side of the heart in the circum-pulmonary cavity; for after every contraction of the right auricle and ventricle, the blood is impelled into them by the atmospheric pressure, and distends their internal surface with a force greater than that to which their external surface or that looking towards the lungs is subjected. This will be best seen by referring to our typical apparatus (Fig. 10), where V, V, V represent a vein nine inches in height, and kept constantly full, or of which the blood has a corresponding propulsive force. Varying its direction, the vein enters the circum-pulmonary cavity and expands at H into a single pulsating ventricle like that of a crustacean, from which issues an arterial trunk A, which passes out of the circum-pulmonary cavity and discharges its blood. When the air-sac S is undistended, the air in the sac and that in the circum-pulmonary cavity have the same tension—that of the external air; and if the heart were now to act, the blood would be urged into it solely by its own propulsive force and whatever expansive force the heart may possess. But on fully raising the piston the sac is distended to D, and the air in the circum-pulmonary cavity becomes less dense than the external air or that in the air-sac. The consequence is, that in addition to the forces just mentioned, the blood is urged into the heart with a force equal to the difference between the pressure upon its internal and external surfaces, or between the tension of the external air and that contained in the circum-pulmonary cavity. But after an ordinary expiration, the air-sac does not return to its original size S, when there would be again equilibrium in the air within and without the circum-pulmonary cavity. The sac is only emptied by one-eighth as it descends from D to *d*, so that there is still inequality of pressure between the two sides of the heart. In this way the blood, after an ordinary expiration, instead of being forced backward out of the chest as has been commonly thought, is still impelled into it at every emptying of the cavities of the right side of the heart. By this admirable arrangement, the pneumatic

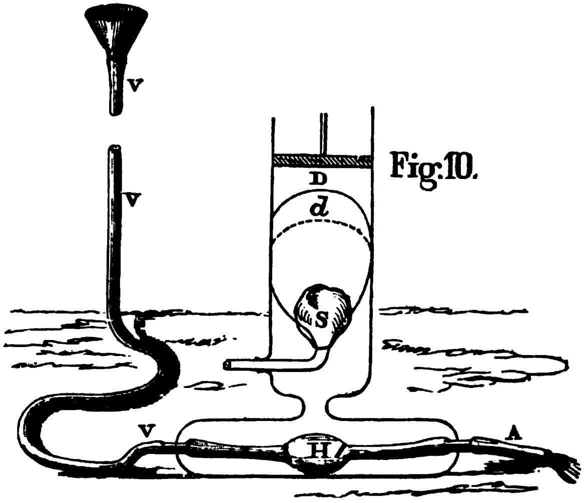

Fig. 10.

force of the chest, which of itself could act only during inspiration, is converted into a constantly acting force, drawing the blood inward at every beat of the heart, and in greater quantity the more rapidly the heart beats. The only difference the respiration occasions being to make the rush of blood into the heart somewhat greater or less as the lungs are more or less distended with air.

These remarks apply only to the right side of the heart. It is true that the left side of the heart and the whole pulmonary blood-vessels form part of the circum-pulmonary cavity. But in the adult they are quite secluded from all pressure of the external air by the barrier which the right side of the heart interposes. On the left side, therefore, the heart is dilated solely by its own expansive power, and by the stream of blood projected from the right ventricle. The aid of a pneumatic force situated on the right side is given to the left ventricle alone, which stands most in need of it from the more arduous labour it has to perform.

(To be continued.)

II.—CASE OF EXTRA-UTERINE PREGNANCY.

By JOHN WILSON, M.D., *Physician to the University Lying-in-Hospital, Glasgow.*

CASES of extra-uterine pregnancy are happily of rare occurrence, and such as advance to nearly the full period are rarest of all. It is not, however, on this account alone that I have been induced to lay the following history before the profession, but rather because it so clearly illustrates the probable issue, in similar circumstances, of non-interference by the peritoneal section. The leading features of the case are these:—The *fœtus* died at the end of eight months after conception, and the *mother*, at the end of twelve months, undelivered. Seven weeks before the death of the mother the pregnancy was ascertained to be extra-uterine, and yet from day to day, amid a multitude of conflicting questions, it was judged reasonable to delay, at least, the peritoneal section. Our opinion as to the nature of the case was confirmed in every respect by a very careful *post mortem* examination, conducted by Dr Joseph Coats and Dr J. G. Lyon, at which I was present, noting down and also sketching appearances at different stages of the dissection.

History of case.—Mrs M., aged 30. Married 21st June, 1861.

First child, born 28th April, 1862. Female,—full time; died at 3¼ years of spinal disease.

Second child, born 19th May, 1864. Male,—living now.

Miscarriage, at 10th week, in February, 1867; accompanied by "inflammations," as she terms them.

In December, 1868, became pregnant for the fourth time, last menstrual period having been early in December.

She was conscious of the life and motions of fœtus up to 18th August, 1869, but no later.

Speaks of having had many "inflammations" during this pregnancy,—on 3rd Feb., 1869, and at intervals up to 8th month of gestation,—the last of these "inflammations" being on 18th August, since which, as already said, she has not been conscious of life or motion in the child. Some six weeks before this attack (*i. e.*, beginning of July) she had "bearing down pains," which continued night and day.

When young she menstruated regularly every three weeks. She had a coloured discharge on 18th Sept., 1869, and three weeks afterwards (9th October) she had another.

October 11th, 1869—Patient in bed.

Abdomen enlarged, and, to the touch, cold and sodden.

Solid mass distinctly felt through abdominal walls, corresponding with an eighth month fœtus in size and contour, lying transversely, head towards left groin.

Apparent absence of amnionic fluid.

No fœtal movement or pulsation or placental murmur.

Dull continuous pain in back.

Vaginal examination revealed a firm projecting uterine cervix quite closed.

No presenting part of fœtus could be made out through uterine and vaginal walls.

Simpson's uterine sound could only pass about 2½ inches —(supposed due to obstruction by fœtus.)

Warm water injected into uterus found no lodgment, returning instantly slightly reddened, and producing no action.

These observations, together with the previous history of the case, however much they seem *now* to indicate the fact of extra-uterine pregnancy, did not do so then, and hence it was resolved to wait and observe what course nature might take, the more so as any interference, however simple, seemed only to encourage inflammatory tendencies. During the latter half of October she had two rather severe attacks of peritonitis, the more urgent symptoms of which were subdued by leeches, hot poultices and opium, but there remained considerable tympanitis, a high pulse, rarely under 120, frequent vomiting and diarrhœa,—yet no pain complained of in abdomen or elsewhere.

On 4th November Dr J. G. Lyon saw patient along with me, and after this daily. Her condition then was—Tongue dry and glazed, with some sordes; frequent vomiting and diarrhœa; pulse 120, feeble; profuse sweating. She was at this time taking opium gr.iij. at bed-time, gr.ij. in the morning, with generally gr.ij. in the course of the day. The abdominal and vaginal observations were corroborated.

Nov. 14.—Having now for some time suspected the possibility of the pregnancy being extra-uterine, we made special examinations in that view. The uterine sound could, as formerly, only be passed about 2½ inches. By digital examination we found that we could reach the body of the uterus through the lax vaginal walls, and that it did not seem larger than it would be in an unimpregnated condition.

These circumstances, together with the whole previous history of the case, seemed to us conclusive as to the pregnancy being extra-uterine. We communicated our views to the husband of the patient, who was quite willing that any course should be followed we might think best.

Is, then, the patient strong enough to survive the operation of gastrotomy?

Is she so weak already, and getting more so, that immediate operation is imperative to give her a chance of life?

Is she strong enough, or already too weak, to endure the gradual formation of an abscess and its evacuation, either externally or internally?

However successful ovariotomy now is, observing all due precautions, are there not unusual risks here—such as with regard to the removal or non-removal of the cyst and adherent placenta?

Such questions daily presented themselves to us for solution, and the daily reply was—Wait, rather than operate now. In this course, moreover, we were sustained by the valuable opinion and advice of Prof. Leishman.

Day by day she continued as before, with slight variations, but not perceptibly becoming weaker—vomiting less frequent, and bowels less purged. The following notes are selected from those taken from time to time:—

Monday, Nov. 22.—Some vomiting of an almost stercoraceous character.

Saturday, Nov. 27, Evening.—A large quantity of matter vomited, decidedly stercoraceous; bowels acted once; stool natural.

Thursday, Dec. 2.—Is taking champagne with a relish, also Liebig's Extract of Meat.

Tuesday, Dec. 7.—Back excoriated at lower part of sacrum; placed on water-cushion, from which she experiences great relief. Is taking Selected Carlowitz with relish; tongue cleaner.

Friday, Dec. 10.—Has continued much the same; back healing; no more stercoraceous vomiting, though occasional vomiting of bilious matter.

Monday, Dec. 12.—Has had rather severe diarrhœa since yesterday afternoon; much sunk in appearance.

Friday, Dec. 17.—Abdomen measured at umbilicus 27 inches; is evidently much smaller than it was; feet œdematous, especially left foot.

Thursday, Dec. 23.—Patient very low; no diarrhœa or vomiting; complains much of soreness of trochanters; on examining abdomen, *a point below and to right of umbilicus is very tender on pressure.* She can take a little whisky from time to time, but scarcely anything else.

Thursday, Dec. 30.—Since last note patient's strength has been failing very considerably, as indicated by *quality* of pulse, though still 120.

Sunday, Jan. 2, 1870.—Patient died at 5 A.M.

Autopsy—January 4, 1870, 50 hours after death—by Dr Joseph Coats and Dr J. G. Lyon, I being present.

Body very much emaciated; cheeks sunken; abdomen flat, but slightly tympanitic; peculiar opisthotonic condition of body; general abdominal surface shewed slight greenish hue of decomposition; at right side are nine dark bluish-green spots, each ⅛-inch in diameter, recognised as leech-bites; bed-sores on both trochanters (slight), and on sacrum; considerable œdema of both legs and feet; large serous bulla on inner surface of each thigh; several on posterior surface of body; one the size of an orange on left dorsal region,—these being *post mortem* phenomena.

A superficial incision was made from top of sternum to pubes in the middle line, passing immediately to right of umbilicus. Sternum was then sawn through longitudinally, chest opened and kept apart by Dr Russell's *post mortem* screw, thus giving greater freedom for abdominal section. The muscular layer of abdominal wall was then divided, and the parietal peritoneum exposed. This was so adherent to a thin subjacent layer of tissue that, in endeavouring to separate them, a large cavity was opened, from which there came a rush of fœtid gas. A firm mass of a pale colour presented itself through the opening, part of side aspect of a large fœtus. The cavity was evidently that of a cyst. *About three inches below umbilicus, and slightly towards the right, there was a perforation through the adherent layers of tissue (cyst wall and peritoneum), and a deposit of purulent matter immediately beneath muscular wall of abdomen at that point.* This is exactly the position of the part of the abdomen tender on pressure during the last ten days of life, and indicated the commencement of an abscess which would probably ere long, had the patient lived, have opened on abdominal surface.

On cyst being laid fully open by an incision, avoiding the perforation, a large blanched fœtus was exposed—somewhat crushed together—lying across abdomen, back towards transverse colon, head in left groin. It was a full-sized eighth month female fœtus, not shewing much sign of decomposition, but rather presenting a sodden, shrivelled aspect, as if taken out of spirits of wine*—head crushed together laterally, and bare rough edge of bone perceptible along sagittal suture.

Fœtus being removed, umbilical cord was found adherent to anterior wall of cyst, and was traced towards left side, where, at a short distance, it became lost in a spread-out mass of dark-coloured friable tissue, having remains of large vessels in its substance, evidently placental. The extent of this placental layer was difficult to define accurately, but it seemed to line the greater portion of the cyst wall (except anteriorly), the dorsal and lateral aspects of cyst wall, moreover, being closely adherent to the visceral peritoneum with all its inequalities of surface.

The womb was found to be intact, and rather *under* than over the normal size of an unimpregnated uterus (not a usual circumstance in extra-uterine pregnancies). The left cornu, Fallopian tube, and ovary, with the broad and round ligaments, were all involved in the adjacent portion of the cyst. The uterus, with its appendages, including a portion of the attached cyst wall, were then removed for after study, and are still preserved.

Dr Coats, Dr Lyon and I met that evening and endeavoured to ascertain what might be the precise character of the pregnancy, whether tubal, ovarian, or peritoneal (for certainly it was not interstitial, *i.e.*, in the uterine wall). A longitudinal incision was made through the anterior wall of the uterus,—cavity very small,—mucous membrane smooth, and of a bright pink colour. Right Fallopian tube, fimbriæ and ovary readily distinguishable. Left fimbriated extremity and ovary not distinguishable from attached portion of cyst. The general cyst wall in the peritoneal cavity had not been so easily demonstrable as the portion of it more immediately attached to the uterine appendages, having had rather the appearance of a fibrinous exudation than an expanded original tissue,—so as to indicate rupture of the primordial cyst and the formation of a secondary cyst in the cavity of the peritoneum. Thus the pregnancy may be viewed as having been originally tubal or ovarian, but latterly of a mixed character, *i.e.*, either tubal and peritoneal or ovarian and peritoneal. At a less advanced stage, and before the parts had become so amalgamated by repeated attacks of peritonitis, the special character of this pregnancy might probably have been more easily demonstrated.

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* In a very interesting case reported by Dr Dyce, of Aberdeen, (*Medical Times and Gazette*, 1860, Vol. II.), where a mature fœtus had been retained eight years in its cyst, during which period the woman bore two healthy living children, and died ultimately from inflammation of cyst, without operation, the general surface of the fœtus is described as having been covered by integument, which was converted into *thick adipocire*, and when this had been removed from the parts, the muscles could be seen clean and healthy-looking.

The eminent French surgeon, Sabatier, so long ago as 1796, described the ordinary terminations of extra-uterine conceptions with a clearness which has not been much added to by subsequent observers. He says,* "However, it is rare that extra-uterine conceptions arrive at maturity. Still, we observe some infants formed in the tubes arrive at the term of nine months,—perish because they cannot be expelled, and because they want nourishment,—become decomposed in the sac which encloses them,—induce inflammation in the walls of the sac and the neighbouring parts, which, after fixing these together by manifold adhesions, ends in suppuration,—produce abscesses, some of which point towards the surface of the abdomen, and others towards the rectum, and pass out in fragments through the openings of these abscesses. In other cases the children are dried up, the sac which serves to enclose them becomes hardened and almost ossified, and they are preserved in this condition during a long series of years,* without the women suffering any other inconvenience than that which results from the bulk and weight of the tumour which they have in the abdomen. But it is more common for the sac that encloses the infant to become ruptured at half-term, from want of power to stretch more, thus allowing it to fall into the abdomen, and pouring out from the vessels which ramify over its walls a quantity of blood so considerable as to cause the women to perish in the course of so many hours."

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* De la Médicine Opératoire par le C^{en}. Sabatier. Paris, 1796. Tome premier.

He is equally clear on the question as to surgical interference in such cases,—more especially whether, if at all, it should be resorted to before or after surface ulceration,—that is, whether by way of *primary* or *secondary abdominal section*, as they have been more recently termed by Mr Jonathan Hutchinson of the London Hospital.† The following are the views of Sabatier‡:—"Would it be possible then, or ought we to perform the Cæsarian operation just as if the infant were contained in the womb? Are we sure that the sac which contains it is susceptible of contractions as strong as those of the walls of that viscus, and that the incision about to be made will not be followed by mortal hæmorrhage? Will it be easy to detach the placenta and to remove this body entirely? By what channel, finally, shall be conveyed the discharges analogous to those of the lochia? and will these, escaping into the abdomen, not cause the woman to perish? The risks which she runs when her delivery is left to nature are much less serious." Again,—"The infants conceived out of the ordinary localities perish before their bulk has reached the full limit. It only remains then to second nature by encouraging suppuration, if it begins to appear, by means of appropriate cataplasms; by making a suitable opening, or by increasing that which is spontaneously made; by withdrawing the shreds of flesh and the bones gradually as they present themselves; by breaking with bone pliers those whose size keep them in the cavity of the abscess, as Littre did in a case of this kind, where the abscess opened in the rectum near the anus; finally, by cleansing by means of injections."

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* See *Medical Times and Gazette*, 1860, Vol. II. 21 cases adduced where fœtus (nearly of full growth in each case) was retained for the following numbers of years:—4 (several), 6, 8, 9, 10, 14, 14, 20, 22, 25, 26, 28, 32, 33, 35, 35, 48, 52, 55, 56.

† *Med. Times and Gazette*, 1860, Vol. II., p. 57.

‡ Sabatier, op. cit.

In the present example of extra-uterine fœtation, the constitutional disturbance was very great, and this, while it seemed to urge the necessity of immediate action, seemed at the same time to set it aside as doubly hazardous. Successful instances, moreover, of primary abdominal section (the only operation which could have been performed) are not nearly so numerous as of secondary.* Yet the question still arises,—Were a similar case again to occur, would it be possible by operation to avert speedy death? Towards the solution of this question, instead of appealing to general statistics, I prefer to select from a great number of cases *one which is parallel with the present in its most essential aspects*, yet with a happier issue. The extreme constitutional disturbance and its organic results referred to in the following notes from a report of a case of extra-uterine fœtation, by Dr Frederick A. Stutter of Sydenham,† are points to which I wish to direct special attention.

Abstract.—*Death of Fœtus at full time—Fœtus retained five weeks—Extreme constitutional disturbance—Primary abdominal section—Mother's recovery and restoration to good health.*

In December, 1858, she had pain and extreme tenderness over the whole belly, most marked on the left iliac region. There was incessant vomiting, constipation, great thirst, and a quick, small pulse. On the second day the vomited matters were of a stercoraceous character. In the latter part of the month she had an almost similar attack, and a third occurred in the end of January, 1859. . . . Through July and August she continued to get more and more feeble, and was troubled with vomiting of almost everything that was taken. Her pulse ranged between 140 and 150, her mouth became covered with aphthœ, and it was evident that she was fast sinking. The operation was performed on August 21st. The patient was almost moribund, troubled with constant hiccough, and bathed in cold perspiration. For several days she had vomited almost incessantly, and had also suffered from profuse diarrhœa. The surface of the abdomen below the umbilicus—that is, over the most prominent part of the tumour, —was becoming discoloured, and there was distinct fluctuation to be felt. Chloroform having been administered, Dr S. plunged a trocar into the most prominent part of the tumour in the median line, a few inches below the umbilicus. About 60 ounces of turbid, brownish fluid escaped. This fluid had a fœtid odour. With a bistoury passed down through the abdominal wall, by the side of the canula, a free incision was made directly upwards, and another downwards, to the extent together of about six inches. The back of the child now presented. The hand having been passed into the abdomen, the child's feet were seized, and extraction was accomplished without difficulty. The child was a female, weighing 5½lbs., skin peeling off, and body undergoing decomposition. The placenta was found to be firmly adherent over the surface of the intestines, and no attempt was made to get it away. In dividing the abdominal parietes no cyst wall had been noticed, the structures being all closely agglutinated by inflammation. Neither omentum nor coils of intestine were exposed to view in the operation. The latter were probably protected by the placenta, which was of large size and spread out over them. Having sponged out the cavity, the edges of the wound were loosely brought together by strips of plaster, and sponge having been placed over it, the whole was confined by an abdominal bandage. For about a fortnight she remained in an extremely critical condition, though each day gaining a little. The irritability of stomach subsided, and she became able to take larger quantities of food. The cavity which had contained the child suppurated freely, and was regularly syringed out with warm water twice daily. The placenta loosened, and was removed *en masse* on the fifth day. After the placenta had come away, her improvement was more rapid. In about three weeks from the date of the operation she might be considered out of danger; in six weeks the wound was closed, and in three months she left her sick-room and was able to resume her household avocations. Four months after the operation she menstruated, and continued to do so regularly afterwards. The cicatrix in the abdominal wall was very small, with no perceptible induration or enlargement beneath it.

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* Hutchinson, *Med. Times and Gazette*, 1860, Vol. II. Dr D. L. Roberts, *Trans., St Andrew's Med. Grad. Assoc.*, 1867.

† *Medical Times and Gazette*, 1860, Vol. II.

It thus appears that when a patient is almost moribund, it is possible to save her life by the primary abdominal section, and that even without any of those precautions and appliances which contribute so much to the success of the major surgical operations at the present day, and among these of ovariotomy. But it may be said, Why refer especially to ovariotomy? Is not the cyst entirely removed in this operation? That it is not always so I shall show by quoting a few remarks on the subject by Dr Clay, of Manchester*:—

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* *London Medical Review*, August and November, 1861.

"The adhesions to the peritoneum are in broad patches, and often peel off with moderate ease, but in some cases are so firmly organised that it is better to cut off the tumour at the edges of the adhesion, leaving the broad patch of the adherent portion of the tumour attached to the peritoneal surface, to slough off and discharge itself by the aperture left for the ligature at the pedicle. I have frequently done this without any bad consequences arising from it. It is a curious fact that those cases have often made the most rapid recoveries where there have been the most extensive adhesions, and considerable force required to overcome them."

The ratio of recoveries in ovariotomy, which may be viewed as a primary abdominal section, is nearly 70 per cent., and this notwithstanding the by no means general adoption of the precautions and appliances referred to; and it is probable that the *sphere* of this operation will ere long be enlarged by the general adoption of these means, although a higher *ratio* of success may not reasonably be looked for. Moreover, we cannot but hope that the benefit of these means may yet be extended to extra-uterine cases, such as the present, where, without relief by operation, the patient must speedily die.

III.—ON THE TEMPERATURE OF CHILDREN IN PLEURISY.

By JAMES FINLAYSON, M.D., *Manchester.*

THE course of the temperature in pleurisy is not regarded as typical. Indeed, Wunderlich, in his recent book,* groups together the inflammations of the serous membranes, both of the chest and abdomen, and speaks of them as exhibiting, so far as temperature is concerned, a great degree of laxity in their type. This renders the study of the present subject somewhat less important. Still, the very absence of a strictly typical course may sometimes be useful, as affording a negative element in arriving at the diagnosis. Moreover, the thermometer has now become so well established as a clinical instrument, and its value in determining the degree of fever in the diseases of childhood is so great, that it is desirable to have some accurate information as to the course of the temperature in this disease also.

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* Das Verhalten der Eigenwärme in Krankheiten. Leipzig, 1868. P. 357.

The only statement bearing on this subject in our language, with which I am acquainted, is contained in the few lines devoted to it in Dr Hillier's recent book on the *Diseases of Children.* His remarks, so far as they go, are tolerably accurate, but they are too meagre to satisfy the reader, especially as they are not supplemented by any thermometrical notes in the reports of the cases of pleurisy recorded in his volume.

The work of Professor Ziemssen on *Pleurisy and Pneumonia in Childhood* * takes up the question in a very comprehensive and accurate manner. His remarks on the course of the temperature seem to me most excellent, and I do not doubt that those who are not already acquainted with his work will be glad to find his opinions on this subject stated, with considerable completeness, in the following extracts:—

Fever.—"It is the general opinion that the fever in pure primary pleurisy is slighter than that of pneumonia. Rilliet and Barthez, indeed, make use of the slightness of the fever for the differential diagnosis of pleurisy from pneumonia. They quote the pulse rate from the first to the third day at from 108 to 120; it is said, however, to fall rapidly, and, indeed, from the fourth to the seventh day to make 96.72 or even only 68 beats.

"Roger found the temperature to reach 40° C. (104° F.) only in one case of double pleurisy. For the rest, his observations are here extremely aphoristic in character: of 10 cases of pleurisy observed, 6 are represented by only one single measurement each, and 2 by a couple of measurements; his figures are so low (37°-38° C.—98°.6-100°.4 F.) that I can only explain them through the deficiency of the method of his inquiry.†

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* Pleuritis und Pneumonie im Kindesalter. Berlin, 1862.

† Mr J. F. Goodhart seems to have obtained similar results to those of M. Roger in the case of pleurisy. His method was similar to Roger's—holding the thermometer in the axilla for three minutes.—*Guy's Hospital Reports*, Vol. XV., London, 1870. (p. 398).

"In the beginning of acute pleurisy, if it manifested any considerable intensity, I always found a high temperature, which came near to that of croupy *(lobar)* pneumonia, viz., 40° C. (104° F.) and upwards. In the case quoted above of a boy 5½ years old, the mercury remained from the 6th to the 10th day at from 40° to 41° C. (104°-105°.8 F.), and twice rose even as high as 41°.6 C. (106°.88 F.). Such cases, however, are proportionately rare.

"In pleurisy with a less violent course, the temperature varies from 39° to 40° C. (102°.2-104° F.) during the first weeks of the disease, *i.e.*, so long as the exudation is increasing. This is the common case.

"The daily remissions show no regularity; the temperature usually falls after midnight, and in the early morning stands at its lowest point. However, even in the forenoon, between 9 and 10 o'clock, the exacerbation begins, and about 11 o'clock it yields a temperature which that of the evening often still further overtops. In other cases, the evening temperature (between 6 and 10 o'clock) was, on the average, the highest out of the 24 hours.

"After the first storm is over, the mercury falls—never suddenly, however, to the extent of several degrees within the space of 24 to 36 hours, as in the case of croupy pneumonia; but it comes down gradually to the extent of from 1° to 1°.5 C. (1°.8-2°.7 F.). The temperature remains at a height of from 38°.5 to 39° C. (101°.3-102°.2 F.) during the period of re-absorption; it may, however, rise to 39°.5 C. (103°.1 F.) or upwards, in the event of the slightest exacerbation of the inflammation. After the complete removal of the exudation, and the cessation of all inflammatory processes, then, for the first time, does the temperature slowly go back to the normal. The evening elevations during the absorption stage are usually rather considerable, as we saw in the case quoted above.

"If the exudation is not absorbed, and an empyema is developed, *i.e.*, if the sero-fibrinous exudation becomes purulent, then the fever continues with a still greater intensity up to death, or to the beginning of a more favourable issue (Perforation, Paracentesis). This hectic fever shows very high degrees of temperature, as we saw in the case quoted above. With the most extreme wasting and an unusually feeble action of the heart, the temperature in this case continued at upwards of 40° C. (104° F.), apart from a considerable morning remission to 38°.6 C. (101°.48 F.).

"I found the same course of the fever, and especially of the temperature, in those cases of secondary pleurisy with purulent exudation, which are developed in connection with Bright's disease, as a sequel of scarlatina. Here the temperature continues at 40° C. (104° F.) and over, up till death, even in the presence of increasing emaciation, and often of enormous dropsy.

"In the complication of pleurisy with pneumonia, whether it be that the pneumonia comes first and the pleurisy is induced, or that the pneumonia appears in the sound lung during the course of the pleurisy, the thermometer shows continually the high temperature of pneumonia; and even when the disease has run its course, the further progress of the pleuritic exudation is marked by a high degree of temperature." (Pp. 50-52.)

Diagnosis of Pleurisy from Pneumonia.—"But for the differential diagnosis, the accurate and continued observation of the fever, and especially of the temperature, is of the greatest weight. We saw in the chapters concerning this subject, that the temperature in croupy pneumonia is in general higher than in pleurisy, and that a pleuritic exudation probably yields such a high temperature as 40° or 41° C. (104° or 105°.8 F.) only when a pneumonic infiltration is present at the same time. We saw further that croupy pneumonia almost invariably terminates by a crisis, that the pulse and temperature incline to sudden and great falls in the course of 12–36 hours, and that they do not rise again,—apart from a slight evening elevation on the first and second day after the crisis. This critical termination, on from the fifth to the ninth day (seldom either earlier or later), is quite wanting in the case of pleurisy. The fever may indeed fall during the days named; but it does not fall abruptly, but gradually, and never, as in pneumonia, to the norm, or below it, but at most to 38° C. (100°.4 F.), and then, during the whole course of the absorption, it varies between 38° and 39° C. (100°.4–102°.2 F.); it even exceeds these figures when there is any exacerbation of the pleurisy, or when the process of absorption experiences any sudden check. Further, in pneumonia incomplete remissions of the temperature occur, sometimes even on the third, but generally on the fifth, and very markedly on the seventh day (provided the disease is not late in terminating—*i.e.*, on the ninth day or later): these remissions are wholly wanting in pleurisy, unless it be complicated with pneumonia." (P. 118.)

Prognosis.—"First, of the greatest weight, is the degree of the fever, and especially of the temperature, in connection with the strength of the patient and the duration of the re-absorption. If in a weakened subject, the fever, up to the third, or even fourth week, remains high, or increases again after it had fallen in the second week,—if the exudation undergoes little or no alteration,—if the treatment has been very strongly antiphlogistic and weakening,—if the appetite falls off, and the patient emaciates,—then the prognosis is very unfavourable; we are justified in concluding that the exudation has undergone a purulent change, and we must keep in view the possible development of tuberculosis. . . . A high temperature continuing on till the sixth or eighth week leads us to expect, with considerable probability, a fatal termination. Either acute miliary tuberculosis developes itself in the affected pleura as well as in the other organs, or the fever alone—kept up through the abundant suppuration in the pleura, or through the continuous absorption of decomposed pus — consumes the patient; or, finally, complications—such as valvular disease of the heart, pericarditis, scarlatinal nephritis, &c.—bring on the fatal termination." (Pp. 124–125.)

These remarks seem to me not only so accurate, but so complete, that I have scarcely anything to say by way of supplement or criticism. In appending notes of some cases which came under my own observation when resident at the

Manchester Clinical Hospital for Children, I submit them with the view of illustrating (and so far confirming) Ziemssen's remarks. The cases are the more fairly available for this purpose, inasmuch as the measurements, both in his cases and mine, were made in the rectum. The conditions observed in the following observations were similar to those already mentioned in a previous communication. The measurements were made by myself, with the exception of those summarised in Case 6. The medicines referred to were prepared according to the British Pharmacopœia of 1867.

The first two cases may be taken as representing the course of the temperature in cases of considerable severity, and presenting a large quantity of effusion. They both show a high degree of fever; in both the defervescence was gradual and protracted.

CASE I.

History.—G. Gordon, aet. 8 years, admitted to ward, under care of Dr Gumpert, Nov. 30, 1867. He was a well-nourished boy. Illness said to have begun six days previously, with sickness and cough; no pain; tongue with whitish fur; breath fœtid; bowels said to be regular. Cough is of a hoarse character. Dulness of left side of chest up to level of scapular spine; it does not extend beyond middle line of sternum; cardiac dulness not displaced. Respiration indistinct and very subdued. Ægophony. Slight bulging of intercostal spaces. Left side of chest measures fully ½ inch more than right side at the nipple. Ordered ac. hydrocyan. dil. mj. and liq. morph. hydrochl. miij. every three hours.

Improvement continued uninterruptedly. Dismissed January 9th, 1868. Still some dulness on percussion, but respiratory murmur very good.

Remarks.—This was a severe case. Some difficulty was experienced at first in feeding the boy, owing to his religious scruples (he was a Polish Jew). The highest temperature noted was 104°.8 F. (40°.44 C.) on the second day after admission. The temperature came down very gradually in the course of three weeks to 99°F. (37°.22 C.), or thereby.

Date.	Morning. 7 A.M.	Evening. 11 P.M., unless otherwise noted.			Remarks.
1867.					
Nov. 30		104° F.	P. 130	R. 40	
Dec. 1	101°.6 F.	104°.4	130	...	(At 8 P.M. 104°.8 P. 112 R. 44).
" 2	103°	102°.4	120	40	Dull to upper margin of third rib. Add inf. digit. ʒij. every third hour.
" 3	102°.2	103°.3	110	40	Tympanitic percussion at left apex above the level of dulness.
" 4	103°	103°.2	120	36	Deep dulness up to apex; dulness slightly beyond middle line of sternum. ℞. ol. ricin.
" 5	102°.8	102°.6	122	40	Cardiac dulness 1½ inch to right of middle line.
" 6	103°.2	...	...	...	Cough still severe.
" 7	102°.8	103°.2	110	36	
" 8	102°.6	102°	120	36	
" 9	103°	102°.1	112	34	
" 10	102°	102°	110	40	
" 11	102°.4	101°.8	112	32	Physical signs as before; has had castor oil 2 or 3 times since admission. Medicine continued.
" 12	101°.6	101°.8	118	30	
" 13	102°.2	101°.8	...	...	
" 14	101°	101°	100	32	Resp. audible at apex and percussion tympanitic; stop med. ℞. syr. ferr. iod. ʒss. ter.
" 15	100°.8	100°.8	100	34	
" 16	101°.4	100°.8	102	33	
" 17	101°	102°.2	...	...	(At 8 P.M.). Still improving. About 30 oz. of urine per day.
" 18	101°	101°.3	110	36	(At 9 P.M.).
" 19	101°.2	101°.6	...	...	
" 20	...	99°.1	92	...	
" 21	100°.2	99°.6	...	...	
" 22	99°.4	98°.6	95	26	
" 23	99°.4	99°	84	...	Marked improvement in breathing; dulness much less deep.
" 24	...	99°.5	94	...	

CASE II.

History.—W. Ryan, aet. 7½ years, admitted to ward Feb. 3, 1868, under care of Dr. Whitehead. The date of illness could not be ascertained even approximately. Aspect oppressed; respirations laboured, 60 per minute; pulse, 140; Chest unsymmetrical—right side, 12½ inches; left, 11½ inches; dulness of right side very deep below third rib; respiratory sounds loud and coarse at upper part—very faint below. On left side, percussion very resonant, and breathing puerile. Treated with Dover's powder, gr.ij. and calom. gr. j. three times daily till February 9th; after this, with Dover's powder alone, and from February 18th, with tonics and cod oil.

After the effusion began to subside, crepitant râles and coarse rhonchus were audible on both sides for some time. The child was dismissed on March 7th, with scarcely any sign of mischief in the chest.

Remarks.—The highest temperature observed was 104°.4 F. (40°.22 C.) The defervescence was gradual, but a fall of between 2° and 3° F. (1°.11–1°.66 C.) may be noticed about the time that the effusion began to diminish. The observations were not continued till the temperature reached the normal.

Date.	Morning, 9 A.M.	Evening, 10 P.M.	Date.	Morning, 9 A.M.	Evening, 10 P.M.
1868.			1868.		
Feb. 3	...	103° F.	Feb. 10	...	101°.8 F.
“ 4	102° F.	104°.2	“ 11	100°.7 F.	100°.3
“ 5	101°.8	104°.4	“ 12	101°.2	101°.1
“ 6	102°	102°.5	“ 13	100°.7	99°.9
“ 7	101.6°	103°.5	“ 14	100°.6	100°.6
“ 8	102°	100°.8	“ 15	100°.6	100°
“ 9	101°.8*	101°.3	“ 16	100°.4	100°.2

* Improving; dulness less.

The following notes represent the course of the temperature in a case presenting only a moderate degree of fever. Although the boy had been ill for some time before he was admitted, the symptoms seemed, on admission, even more acute than they had been at any former period.

CASE III.

History.—J. Clegg, aet. 11 years, admitted to ward, under care of Dr Whitehead, Oct. 14, 1867. He had been seen eight days before at the dispensary, and was then said to have complained of pain, and to have been ill for a fortnight. When seen on October 7th there was dulness of the right side of chest, especially deep at lower half; respiration subdued; slight friction râles over upper part of right lung in front. He was ordered Dover's powder and calomel, of each gr. ⅓ three times daily. On October 14 the physical signs were much as before, but the boy complained more of pain; this seemed to be very severe during coughing. Respirations, 30–40. Admitted to ward; treatment continued, and warm poultices applied to the side.

Patient was dismissed on October 29th. Respiratory sounds were excellent, but very distinct dulness still existed over lower part of right lung.

Remarks.—Although the pain was severe, the temperature was only of a moderate elevation—101°.6 F. (38°.66 C.). It fell very gradually to 99°.7 F. (37°.61 C.); after this it was not traced.

Date.	Morning.		Evening.		Remarks.
1867.					
Oct. 14	...		101°.6 F.	P.94	Cough and pain severe.
" 15	101°.2 F.	P.92	101°.5	90	Pain less.
" 16	100°.1	86	101°.2	84	Dulness still; respir. subdued.
" 17	...		100°.4	68	Better; no pain; breathing [bronchial.
" 18	...		99°.9	60	Improving.
" 19	100°	72	99°.7	70	

The two following cases indicate a somewhat more sudden fall of the temperature than Ziemssen seems to admit. Although they rather exceed the amount to which he limits the fall of temperature within the 24 hours, still, the difference is not so great as seriously to invalidate his statement.

CASE IV.

History.—E. Parry, aet. 6½ years, admitted to the ward, under care of Dr Gumpert, on November 27th, 1868. She had begun to complain on the evening of November 20. She vomited next day, and began to cough and to complain of pain in the region of the liver. She was seen at the dispensary on November 25th. The tongue was foul and red at the edges, the lips dry, skin hot, and cheeks flushed. Pulse rather feeble—116. A careful examination of the chest failed to detect any physical signs of disease. On Nov. 27th she was reported to be worse, and to have more pain in the back and head. Her bowels had been rather loose from the beginning of the illness. It was supposed that the case might prove to be one of typhoid fever, and it was arranged to admit her in the afternoon. On admission she was found to suffer from a severe hacking cough; some dulness was detected at the right base behind; but the violence of the fever seemed out of proportion to the physical signs. Next day, however, the dulness was found to extend to the lower half of the right side of chest, the respiration was subdued, the cough continued as severely as before, and there was still much pain in the region of the right false ribs. The bowels were rather loose, and the pulse very feeble. Although the bowels continued loose till December 2, it was evident on the second day after admission that the illness was due simply to the pleuritic attack. Treatment, at first by mineral acids and 2gr. doses of Dover's powder; from December 5th by syr. ferr. iodid.

There were still dulness on percussion, and feebleness of the respiration on the right side, for some days after this; but the child was dismissed perfectly well, on January 2nd, 1869.

Remarks.—The temperature was tolerably high—103°.6 F. (39°.77 C.). A very considerable fall occurred between the 28th and 29th November, amounting to about 5° F. (2°.77 C.), if we compare the one morning temperature with the other, and to about 3° F. (1°.66 C.) if we compare the two evening temperatures. The difference in the early evening temperatures, as compared with those at a later hour, on November 29 and December 2, seems to show that on the former occasion, although the fever had abated, there was still the tendency to an evening exacerbation, while on the latter occasion the opposite tendency had become established.

Date.	Morning.			Evening.			Remarks.
1868.	Hour.			Hour.			
Nov. 28	9½	103°.6 F.	P.124	9	103°.2 F.		Much cough; 2 loose motions.
" 29	10	98°.5	80	9½	100°	P.112	(At 5 P.M. 98°.8.) 3 motions; pulse feeble; whisky, 1 oz.
" 30	10	100°		8½	99°		Pain and cough less; 4 motions; wine, 3 oz. instead of whisky.
Dec. 1	10	99°.2	116	9½	98°.6	80	4 motions; seems better to-day.
" 2	10	98°.8	84	10½	97°.8	80	(At 8¾ P.M. 100°). 2 motions only; tongue cleaning; reduce wine to 2 oz.
" 3	10	99°.1	80	10½	97°.8	80	Pulse irregular; only 1 motion; meat for dinner.
" 4	10½	99°		8¾	98°	64	Pulse and general state better; no cough; 1 motion, not loose.
" 5	...	...		8¾	97°.8	64	
" 6	10	99°.2		9¼	98°.4		
" 7	...	...		8½	97°.8		
" 8	...	...		9	97°.8		
" 9	10¼	99°.4		8¾	97°.6		

CASE V.

History.—C. Sandson, aet. 12 years, admitted to the ward, under care of Dr Gumpert, on Nov. 3, 1868. Said to have been taken ill a week before, with cough and pain in the right side. Aspect febrile; tongue with brown fur. Deep dulness of the whole of right side, with subdued respiration. Ordered liq. morph. hydroch. m.ijss. vin. ipecac. m.v. every four hours.

Dismissed on Nov. 14 with scarcely a trace of dulness in the chest.

Remarks.—There was very rapid absorption of the effusion in this case. The improvement was very marked on the morning of Nov. 5,—as judged by stethoscope. The fall in the temperature from that of the previous morning was only 0°.3 F. (0°.16 C.), so that no indication could be drawn from this fact. The fall of the temperature in the evening, comparing it with that of the previous night, amounted to no less than 3°.6 F. (2° C.), and fully indicated the improved condition.

Date.	Morning.			Evening.			Remarks.
1868.	Hour.			H.			
Nov. 3				8¼	102°.6 F.	P.106	Much pain; coughs much.
" 4	8¾	100°.1 F.	P.120	9½	102°	112	Medicine stopped; seems sleepy.
" 5	8	99°.8	100	9¼	98°.4	88	This morning dulness less, respiration improved; seems better. Castor oil.
" 6	8½	99°.2	70	...	...	...	
" 7	8¾	99°.2	74	9½	98°.2	...	No pain or cough.
" 8	11	99°.3	78	9½	97°.6	74	℞. tr. ferri perchl. m.v. [quater.
" 9	10	99°.1	72	9½	97°.4	80	
" 10	9	99°	60	9¼	97°.8	62	

The following case may be considered in connection with Ziemssen's remarks on Prognosis. Whether the prolonged course of the fever was due to empyema or to miliary tuberculosis must remain somewhat uncertain, owing to the unexpected recovery of the child. I think the probability is that both conditions existed. This case presents the nearest approach to the fatal course of the temperature which I can adduce. Only two fatal cases of pleurisy occurred in the wards under my observation: one child died of tubercular meningitis when he seemed to be recovering from pleuro-pneumonia of the left upper lobe; the other died of empyema and tuberculosis. Unfortunately, I had not made thermometrical observations in either of these cases.

CASE VI.

History.—C. Henry Chester, aet. 4 years and 11 months, was admitted to the ward, under the care of Dr Whitehead, on March 16, 1868. He was a very delicate child, and had previously had several inflammatory affections of the chest. He had complained of cough and "pain in the belly" for a week, and had been feverish for about the same time. The right side of the chest appeared a little shrunken, and measured ⅛-inch less than the left. (Probably this arose from some former affection.) There was dulness of the right side below the third rib; respiration, blowing above, and subdued below. Next day deep dulness extended quite up to the right apex. There was suppression of the respiratory sounds and of the vocal resonance.

He still complained of pain, and said he could not get his breath. The effusion continued to increase, causing bulging of the intercostal spaces, and displacement downward of the liver. The temperature continued high for three weeks. After this an abatement was noted; the physical signs also improved about the same time.

March 19th to April 7th,—Average of Observations,—Morning, 100°.9 F. (38°.27 C.); Evening, 102°.3 F. (39°.05 C.).

April 7th.—Percussion to-day slightly tympanitic at right apex (above the level of dulness); some râles also.—Morning, 100°.6 F. (38°.11 C.); Evening, 103°.4 F. (39°.66 C.).

April 8.—Improving still.—Morning, 100°.6 F. (38°.11 C.); Evening, 101°.2 F. (38°.44 C.).

Improvement of the respiration continued to be noted; but the patient did not seem to be recovering satisfactorily. Profuse perspirations, irritating cough, vomiting, occasional abdominal pains, and emaciation, were the chief unfavourable symptoms. The right side continued dull, the respiration was bronchial, and the resonance of the voice increased. Some dulness on percussion, with harshness of the respiration at the left apex, added to the gravity of the prognosis. The evening temperatures for the next two months continued at a variable height, oscillating between 100° F. and 103° F. (37°.77-39°.44 C.). The morning temperatures were generally somewhat lower. Towards the beginning of June the patient's condition—all along very critical, seemed perfectly hopeless. He was not only very feeble, but extremely apathetic. This disposition, however, was said to be natural to him: not unfrequently he would not speak a word to his mother when she came to visit him. As a last resource, notwithstanding his weakness, the nurse was told to dress him, and he was made to sit up on the couch. This change seemed to inspire some life into him, but in two days he was obviously worse, and had again to be confined to bed. He rallied, however, a little, in a few days, and as I was convinced of the propriety of the step, he was again allowed to sit up on the couch, and strenuous efforts were made to amuse him, by carrying him about from one part of the building to another, and by other similar methods. He began by and by to evince some interest in life, and he would even talk a little when spoken to. Continuous efforts to excite his interest and attention seemed to produce a marvellous change in his temper and disposition. He slowly regained strength, and for a week or two before dismissal he was able to join in a little out-door play. The right side of the chest became much contracted, there was much depression of the shoulder, and considerable lateral curvature of the spine. It was arranged to send him to the country, and he was dismissed on July 31st, wonderfully well. He is now (February, 1870), in very good health, and the deformity of the chest seems rather less than it was. Before dismissal the temperature had become normal.

July 19-26—Average temperature: Morning, 99°.47 F. (37°.48 C.); Evening, 98°.16 F. (36°.75 C.).

The last case which I submit was complicated with whooping-cough. This renders it of little value in the way of elucidating the influence of pleurisy on the temperature. The occurrence of pleurisy at the very beginning of pertussis is, so far as I am aware, an event of great rarity, and as the case was watched with some care, I take this opportunity of placing it on record. It will be observed that the existence of pertussis was not recognised till some time after the admission of the child.

CASE VII.

History.—A. Shaw, aet. 7 years, admitted to ward Nov. 19, 1867, under care of Dr Gumpert. For three days short frequent cough, coming in paroxysms. Herpes of lips, nose, and eyelids. Dulness of left apex before and behind, with bronchial breathing. The case was at first regarded as one of pneumonia of the left apex; but from the sequel, there is no doubt that pleurisy of the right base was the cause of the fever. (It was found afterwards, on referring to the Hospital records, that this child had been under treatment two months before, at the Dispensary, for inflammation of the left upper lobe, and that this part still continued dull on percussion after recovery.) Ordered acid. hydrocyan. dil. m. ½ and liq. morph. hydr. m.j½ every two hours.

Remarks.—This was an instance of an inflammatory affection of the chest ushering in whooping-cough. The child was dismissed, as soon as her state permitted her removal, on account of the infectious nature of the disease. There was still a little dulness of the right base behind. The dulness at left apex continued as before; some moist râles were occasionally to be heard there.

The highest temperature observed was 105° F. (40°.55 C.), on the evening of admission. The temperature was still elevated at the date of dismissal, being in the evening about 100°.5 F. (38°.05 C.). Probably this was due either to the influence of the whooping-cough, or to the chronic mischief in the left apex. The occurrence of a very high rate of the pulse and respiration (towards the latter part of the observations), along with a very moderate elevation of the temperature, is worthy of note. The rapid respiration may have been due to the partially damaged state of both lungs. The violence of the cough no doubt kept up the rate of both. The child was not seen after dismissal, but she was reported to have recovered completely from this illness, and to have died fifteen months later of pleurisy following smallpox.

Date.	Morning. 7 A.M.	Evening. 11 P.M.			Remarks.
1867.					
Nov. 19	...	104°.3 F.	P.120	R.70	(At 7½ P.M., 105° F. P. 140 R.70.)
" 20	102°.4 F.	101°.1	120	70	(At 6 P.M., 103°.7.) A little dulness behind over lower half of right lung, and also in infra-axillary region.
" 21	100°.7	101°.8	130	70	Deep dulness lower ⅔ of right lung with bronchial breathing and ægophony. Give, in addition, inf. digit. ℥i. every 3 hours.
" 22	100°	100°.6	120	70	
" 23	100°	100°.4	110	70	Increase dose of inf. digit. to ℥ij. every 3 hours.
" 24	100°	101°.5	120	72	(At 6 P.M., 100°.4 P. 130 R. 90.) Dulness as before; respiration subdued; to-night, in a violent paroxysm of coughing, a distinct "whoop" was heard.
" 25	100°.4	101°	130	80	Cont. digit. every 2 hours, other medicine as before.
" 26	101°.2	100°.7	130	80	
" 27	100°	100°	124	90	
" 28	99°.2	99°.4	132	90	
" 29	99°.4	100°.2	140	90	
" 30	99°.2	99°.4	130	74	
Dec. 1	99°.4	100°	140	75	(At 7 P.M., 100°.2 P. 134 R. 67.)
" 2	99°.2	99°.2	135	86	
" 3	99°.2	99°	124	80	Sweats much; dulness less; respiration improving. Stop med.
" 4	99°.6	100°.2	130	100	℞. quin. sulph. gr. j. and pulv. Dov. gr. ij. bis. in die. and syr. ferr. iod. mxx. ter.
" 5	99°.2	99°.7	130	80	Percussion and auscultation much improved. Sweats less. Cough violent; spat some blood: evidently has pertussis.
" 6	100°.2	99°.7	...	70	
" 7	100°.1	...	...	...	
" 8	99°.2	101°	128	70	(At 7 P.M., 100°.4.)
" 9	99°.1	99°.2	120	80	
" 10	100°.2	100°.4	120	70	
" 11	100°.2	100°.4	112	72	
" 12	100°	99°	130	72	Paroxysmal cough still. General state much better.
" 13	100°.1	99°.2	...	...	Boils in various parts of body. Fretful. Emaciated.
" 14	99°.4	100°.4	120	68	(At 7 P.M., 100°.4.)
" 15	100°	100°.2	130	70	(At 7 P.M., 101°.)
" 16	99°.2	100°.6	120	...	Dismissed, Dec. 17th.

I have not adduced any cases in support of Ziemssen's statements with regard to the course of the temperature in pleuro-pneumonia. Indeed, I have not observed a sufficient number of well-marked cases of this description to enable me to speak with any confidence on the subject. Nor would it be desirable to enter into such cases unless the typical range in pure pneumonia were also to be considered in this paper. I am, however, quite inclined to agree with Ziemssen that when pleurisy and pneumonia are both present in a marked manner, the temperature tends to follow the pneumonic course. It is to be understood, therefore, that the occurrence of a course of temperature typical of pneumonia does not preclude the possible presence of pleurisy also. In the case of a girl, 11 years old, who presented some signs of pneumonia at the lower part of the left side behind, the evening temperature fell about the 11th day from 104°.9 F. to 97°.4 F. (40°.5 to 36°.3 C.) in the course of 24 hours; yet in her case the most striking symptoms were those of pleurisy of the other side. She had pain in the right side so severe as to cause her frequently to scream out; friction râles were to be heard at the level of the right nipple; and in the lower half of this side the respiration was scarcely audible.

Probably the first violence of the fever in pleurisy is due to the inflammation in the pleura itself; but the main fact in connection with the temperature in this disease seems to be the existence of the effusion. Its presence seems to prolong the fever course, and its gradual absorption appears to correspond to the gradual defervescence, while its conversion into pus seems to prolong and intensify the course of the fever.

Many questions of interest connected with the theory of febrile temperature may be advantageously studied in the light of the thermometry of pleurisy. The striking difference which this disease shows in the course of its temperature from that of lobar pneumonia,—its much nearer resemblance to that of lobular pneumonia,—and its approach to the character of tubercular and hectic fever (into which, indeed, it sometimes passes),—at once suggest themselves as worthy of consideration. The power we have of tracing the absorption of the fluid, and the means we have of removing it by thoracentesis, add further to the interest of the subject when studying the relationship of inflammatory products to the general temperature.

The following seem to me to be the main facts brought forward in the present paper:—

1. The temperature in pleurisy may attain either a moderate (39° C. 102°.2 F.) or a high fever height (40° C. 104° F. and upwards).
2. The defervescence is gradual, is usually protracted, and is seldom complete till the perfect removal of the effusion. The temperature seldom falls more than 2° or 3° F. (1°.11-1°.66 C.) in the course of 24 hours.
3. The fall in temperature occurs about the same time as the improvement in the physical signs in the chest. Sometimes the two are as nearly as possible simultaneous (Cases III. and V.); sometimes the improvement can be noted in the chest while the temperature is still at its height (Case VI.); sometimes a distinct fall in the temperature is noted a day or so before we can perceive any improvement in the chest symptoms (Cases II. and IV.); sometimes a gradual lowering of the temperature has existed for many days before the pleuritic exudation has in the least begun to subside (Case I.).
4. A fever course prolonged on to the second or third month (with or without any previous remission) is very suggestive of the existence of empyema or tuberculosis. It is of very grave, but not necessarily fatal, prognosis.
5. When pneumonia and pleurisy exist together, the disease tends to the pneumonic type.

IV.—A CASE OF SECONDARY ANEURISM OF THE POPLITEAL ARTERY, WITH REMARKS.

By EBEN. WATSON, M.D., *Senior Surgeon to the Royal Infirmary, and Professor of Physiology in Anderson's University, Glasgow.*

IT is very pleasant, and often useful, to publish cases of success in treatment; but the fact of a different result should not deter any one from putting before his profession cases of rarity or interest. In truth, a fatal result, if followed by a careful inspection of the cadaver, so far from diminishing, greatly increases the value and importance of the case, and renders it much more instructive than it would otherwise have been. I hold it, therefore, to be a duty on the part, especially, of those who enjoy the advantages of hospital appointments, to communicate to their brethren, from their abundant opportunities, such lessons as they may themselves be taught, whether by favourable or unfavourable results.

Impelled by this motive, I put the following case on record, as in many points highly instructive as to treatment, and likewise as an example of a very rare occurrence in pathology; since, according to Mr Erichsen,* only two cases of the kind have previously been published.

Henry Stewart, aged 38, was admitted to the Glasgow Royal Infirmary on 7th September, 1869, with a popliteal aneurism. Three years before, he had been admitted for the same disease in the same artery, and I at that time ligatured the femoral artery in the usual place, with perfect success. The man was dismissed with only a small, hard, and solid tumour, not larger than the point of the finger, instead of a pulsatory tumour of the size of a small orange. He remained well, and occupied with the hard work of a labourer, till four days previously, when he was obliged to desist, as the aneurism had again become larger than ever. He thought it might have begun to enlarge a few days before he gave up work, but not many. It was daily increasing in size, and giving more pain, when he came to the hospital. It was then found to be oblong in shape, and about as large as a full-sized lemon. The skin over it was tense, and the pulsation very distinct. The tumour was very painful on pressure. On compressing the femoral at the groin, or in Hunter's canal, pulsation ceased, and the tumour diminished in bulk and tension. Between these two regions the femoral was almost obliterated by the former deligation.

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* Science and Art of Surgery, p. 602.

After consultation it was agreed to apply a ligature on the femoral, just above the aneurism, and in Hunter's canal. This was done at 11.30 A.M. on the 10th, but the pulsation was only checked for a few seconds, and recommenced while the ligature was being secured. The artery was, therefore, at once carefully examined; the ligature was found to be satisfactorily applied; and it was ascertained that compression of the artery an inch below the ligature would not stop the pulsation in the aneurism. The wound was dressed antiseptically; but the stitches, which were of silk, were not drawn tight. The wound was left open till the evening, to allow all oozing to cease before it was finally closed.

In my clinical remarks after the operation, I pointed out to the students that two explanations might be given of the fact that the pulsation of the aneurism was not arrested by the ligature—viz., that there might be in this case two nearly equal superficial femorals; or, secondly, that the collateral circulation had become so free from the long standing of the disease that it was able to maintain the pulsation. The idea of the cause of this phenomenon being a regurgitation into the sac was refuted by two facts:—1st, that a retrograde influx of blood into an aneurism never did cause pulsation; and 2nd, in the present case, compression at the groin at once and completely checked it. Now, two femorals could not be discovered by the most careful examination of this case even through the open wound, and therefore the true explanation seemed to be the freedom of the collateral circulation through the branches of the profunda, for compression above its origin arrested the pulsation at once. The hope then was, that having tied the main artery near to the sac, the collateral circulation might be controlled by rest, cautious bandaging, and other means which the students would see employed in the ward.

The case progressed favourably, so far as the operation wound was concerned. There was very little discharge, and the ligature, which was of prepared catgut, as proposed by Mr Lister, never appeared; but the aneurism continued to pulsate and even to enlarge. Therefore, on the 15th, another consultation was summoned, at which it was determined still to try to save the limb by applying a ligature to the external iliac.

I accordingly performed the usual operation, and applied a catgut ligature round the external iliac, by which the pulsation was at once and entirely arrested. The wound was dressed as before. Nevertheless, it was, a few days afterwards, attacked by erysipelas, and part of the skin and areolar tissue at the edges of the wound sloughed. Very little pus was at any time discharged, and, in fact, the destruction was superficial. The ligature did not come away, and the wound soon became clean and healthy. The temperature of the foot and leg remained quite good, and the man, though weak and fretful, was in very fair health. His appetite was good, he now slept pretty well, and his bowels were opened every second or third day.

On the 17th, however, the sac began to slough, and a few days afterwards his health fell off. He was restless and uneasy, and his abdomen was large and tympanitic. He refused his food, and frequently vomited when persuaded to take it. His bowels were relieved by warm water injections, and he had a few calomel and opium pills.

By such treatment he improved, and was able to take soup and wine. The wounds looked well, and were granulating without suppuration. The slough in the sac separated slowly, and being protected by the lac plaster and a bandage, as well as by the firmness of its contained clot, no blood was lost.

On the 28th it is noted in the ward journal that the patient is very decidedly better, feeling easy, and taking his food freely with relish, and without sickness. Pulse, 88,—of good strength. This improvement continued till October 3rd, when, at 6.30 A.M., he lost a considerable quantity of blood from the sac. A compress and bandage were applied, and when he had rallied (next morning), by advice of a consultation, amputation was performed at the knee. The stump was dressed with lint wet with the spirituous solution of carbolic acid.

He rallied from the operation, and seemed to be doing well, when suddenly, on Saturday 15th, eleven days after the amputation, he expired at 2 P.M.

On the 17th the body was inspected, and the following state of matters was found :—

External appearance.—The stump is healthy ; granulating in part and in part adherent. The wounds in abdomen and thigh are both in the state of superficial granulating sores ; the latter (the wound in the thigh) being almost closed.

Thorax.—The heart was large, flabby, and loaded with fat externally. Its muscular structure was pale, and though not examined microscopically, I have no doubt that it was in a state of fatty degeneration. The coronary arteries were hard and calcareous as well as enlarged, so as to render their distribution abundantly distinct. The arch of the aorta was likewise hard, and with numerous calcareous deposits.

Abdomen.—The peritoneum was found quite entire and normal in appearance. There was no fluid accumulated within its cavity, but part of the omentum was found adhering to it, just inside the seat of the wound, in the wall of the abdomen. All the viscera were healthy.

The only abnormal phenomenon discovered was an extravasation of blood behind the peritoneum, and between it and the muscles of the pelvis and lumbar region. It was coagulated, and about one inch in its thickest part. It extended from the level of Poupart's ligament, though becoming much thinner as it ascended, to the diaphragm. The arteries were dissected out from the bifurcation of the abdominal aorta, and are preserved. Both the iliac arteries are larger and thicker in their coats than usual, and they contain occasional patches of calcareous matter. When slit up, the left external iliac artery (the one tied) is seen to have its lining membrane reddened to some extent at the place of ligature, especially below that place; and, immediately above, there is a clean slit through all the arterial coats, extending across the anterior half of the vessel parallel with the mark left by the ligature. This mark was not a rupture of any of the coats, but simply the abrupt termination of the redness mentioned above. The arterial lining was smooth and unbroken, and there was no evidence left of diminution of the calibre of the vessel. Neither was there any trace of the catgut ligature to be found; and the impression on my mind is that the ligature did not confine the vessel for more than a few hours—a sufficient length of time, however, to produce partial coagulation of the blood in the aneurismal sac: for the pulsation never returned, and even when the sac sloughed the hemorrhage was apparently from the recurrent circulation, and not direct. Another curious circumstance is that the vessel at this place was quite empty—there was no clot, or even a shred of lymph, adherent to this part of the vessel. Just under Poupart's ligament there was found a small aneurismal tumour opening into the back part of the artery. This had evidently burst, though it was partly filled with a loose coagulum, and it was at this spot that the extravasation commenced and spread upwards. In my opinion this rupture was the origin of the fatal bleeding: (1) Because it was sufficient; and (2) Because it was just situated where the extravasation commenced. On the other hand, I believe that the slit in the artery was made by the knife at the inspection: (1) Because such a rupture would have permitted a much greater quantity of blood to escape suddenly than was found extravasated; (2) Because, from the position of the opening, this extravasation would have ruptured the peritoneum and been seated in its cavity; (3) Because the blood really was found at the back of the artery and of the peritoneum; and (4) Because of the clean and exactly transverse character of the cut—such a rupture, if a rupture, would have been ragged, and probably bevelled by previous ulceration of the coats. So much for the source of the hemorrhage. Tracing the artery farther down, its calibre was found much diminished at the position of the first ligature, which was a silk one, and its coats, as well as the tissues in the neighbourhood, were considerably thickened. The anastomotica magna was found to be impervious, or nearly so, while the branches of the profunda and of the popliteal itself were greatly enlarged. At the site of the ligature which was placed on the artery in Hunter's canal, it should be mentioned that the coats of the vessel were very deeply reddened, and it was filled with an adherent clot; but, nevertheless, its calibre was not diminished. There was no trace of this ligature—a catgut one—to be discovered.

It will be confessed by every attentive reader of the preceding case that it is a very remarkable one, and probably even unique in many of its features: (1) It is a case of return of aneurism a second time to the same artery, after complete cure of the first such affection, and that at an interval of three years—thus making it impossible to doubt the completeness of the cure. (2) Neither can there, I think, be any question as to its being the same artery, and the same part of it, too, that was affected on both occasions; for the whole of it was involved in the aneurismal enlargement. (3) It is also obvious that a large part of this man's vascular system was diseased to a very great extent; and (4) Therefore the treatment was not at all likely to be successful, in whatever way conducted. I am well aware that the means employed in this case may be criticised by some; but I confess that, even with all that I now know of this case by inspection, I still think that ligature of the external iliac was the proper practice to pursue. To cut down upon and to open the sac itself with the view of securing the popliteal artery above and below the aperture into the aneurism, would have been, to say the least, highly dangerous at the time, and full of risk at a future period. The ligature in Hunter's canal was done in compliance with the opinion of a very high surgical authority, given to one of my colleagues in a similar case, but it was very insufficient in the present instance, because of the long-continued and great disease of the collateral arteries. The ligature of the external iliac was successful as an operation for the aneurism, and had it not been for the untoward circumstances recorded above, might have saved both the life and the limb of the patient. I confess, however, that from the calibre of the artery not having been diminished by either of these two ligatures, and from my experience of the short time that catgut remains on the arteries of stumps, I do think that ligatures of that substance are not quite trustworthy for the closure of important arteries. In another case of popliteal aneurism, which has lately occurred in my practice, I have therefore employed the silk ligature, and with the usual gratifying result,—a complete and easy cure.

V.—CASE OF RECOVERY AFTER RUPTURE OF THE UTERUS.

By DAVID BLAIR, M.D., *Ballachulish.*

RUPTURE of the uterus, fortunately, is of rare occurrence in obstetric practice, and recovery of the woman, unfortunately, in these cases, is still rarer. For these reasons, I venture to record the following case of rupture and recovery:—

About 1 P.M. of Wednesday, 15th May, 1867, as I was proceeding homewards, after visiting a few patients in the village of Port-Ellen, Islay, I was suddenly accosted by a woman—or, rather, women, for there were three of them—who asked me to see Mrs N., who, they said, was in labour, and her husband refused to call a doctor to attend her, as he had stern doubts as to the paternity of the infant. I knew well the antecedents of the husband (who, by the bye, is a member of the craft called "tinkers"), and remembered that his wife had a few months previously presented herself to me for examination, on account of various bruises she had sustained in a domestic disagreement with him. I mention this merely for the purpose of showing that the patient had been exposed to circumstances which probably had some share in leading to or occasioning the accident I am about to relate, and I find in Dr Edward Rigby's *System of Midwifery* the following statement:—"Another circumstance which influences, to a certain extent, the frequency of rupture of the uterus, is the rank of the patient. In private practice, especially among the better classes of society, it is an extremely rare occurrence; but, in the lower grades of life, several causes concur to render it more frequent; they are much more exposed to falls, bruises, and other accidental injuries during pregnancy, in consequence of which the uterus may be either ruptured at the time they have sustained the violence, or may be so weakened in structure at some particular point as readily to give way during its efforts to accomplish delivery."

I at once complied with the request of the trio of matrons, and went into the house, where, on a pallet of chaff and straw, in a miserable box bed, lay the poor woman in labour, her only attendant a partially blind pauper, who, from charitable motives, had come to contribute her modicum of sympathy. The patient's age was about 35 years, and this was her second confinement. Labour, I was informed, had begun during the previous night. At the time I entered the house she had a smart pain, and I proceeded without delay to make an examination; but before I had accomplished this the liquor amnii suddenly escaped, carrying with it a large circular piece of the membranes. I found the os uteri fully dilatable, and the head only entering the pelvis. From this time the pains went on steadily, and I waited patiently, anticipating a not very protracted labour, as at each successive examination I could note progress. Occasionally she felt sick, and vomited the drink she was taking; but this did not cause me any anxiety, as otherwise she appeared in all respects in a favourable state. Pulse good; no fixed pain in abdomen; no hæmorrhage; pains neither very frequent nor severe. In this manner she went on till about 3 o'clock, when I observed that she continued rather restless, and began to shed tears after having a pain. I asked her why she cried so, and she replied, "Oh, the pain I have there," placing her hand on her abdomen under the umbilical region; and further, on being interrogated, she said the pain was now without intermission. At the same time, she complained of feeling cold and sick, and vomited a quantity of light brown fluid. Immediately I made an examination to ascertain if any accident had occurred, as I dreaded from the symptoms that such was the case; but so far as I could detect there was no change; the head was low in the pelvis, and there was no hæmorrhage. Supposing her uncomfortable feelings might arise from flatulence in the bowels or some other temporary cause, I sent off for my enema instrument, and in the meantime, until the messenger returned with it, ordered hot cloths to be applied over the patient's abdomen; and to admit of this being done properly, she was gently turned over on her back. She expressed herself relieved of the pain somewhat by the hot application, and I gave her about half a glass of spirits in warm water, to check an inclination to shiver which she experienced. Her condition now was becoming rapidly more alarming; the pulse had become so quick and small that I could not count it; she seemed almost in a state of collapse, and apparently there was a cessation of labour. All these unfavourable symptoms occurred within a very short space of time, and each, as observed, confirmed my unpleasant conviction that something serious must have taken place. For the purpose of again making an examination, I moved the patient back to her former position on her left side. Between this examination and the preceding there could not have been more than fifteen minutes; but the interval, although a short one, had witnessed a serious change. Then the head was presenting low down in the pelvis; now I could not reach it, and my hand, when withdrawn, was covered with blood.

These signs, taken in connection with the symptoms above described, were to me conclusive evidence of the nature of the case I had to deal with. Accordingly, I at once sent for Dr Campbell and for my midwifery instruments, and made a neighbouring woman, who had fortunately come in, get into the bed and take the patient's head reclining on her knees. I then cautiously introduced my left hand into the vagina, pushing it gently upwards into the uterus, which I found was filled with clotted blood. After a little searching my hand came in contact with a foot (the only part of the child, I may here remark, I could find in the uterus), which I grasped, but it slipped on account of the hæmorrhage which covered it. Again I seized it, however, and by degrees succeeded in bringing it down external to vagina. Then the nates and the other foot duly followed. At this stage Dr Campbell arrived, and by our united efforts delivery was soon accomplished. We had great difficulty in bringing the arms and the head through the outlet. The child was dead. The placenta came away immediately. The uterus contracted, and a bandage was in the usual way applied round the body. We gave patient forty minims of solution of morphia, and remained in the house for an hour, during which time she vomited frequently. Before leaving I gave strict injunctions to have her kept quiet.

At 7 P.M.—Very sick; very weak. No discharge.

At 11 P.M.—Still very sick and very weak. No discharge. To take an opium pill at once, and a calomel and opium pill three hours afterwards. To have a cloth saturated with turpentine applied to abdomen under bandage.

Thursday, 16th,—9.30 A.M.—Found her comparatively quiet; had slept for some hours during night; had passed urine shortly before my visit, and had not vomited after taking the pills. Tongue slightly coated; thirst not extreme. Pulse, 120. Uterus feels larger than natural, and is painful on pressure. No discharge. She feels stronger and better this morning. To have as diet cornflour gruel with milk. To take an opium pill.

At 1 P.M.—Much the same as at last visit.

At 9 P.M.—Visited with Dr Campbell. Patient continues on the whole favourable. Pain of uterus less. Bandage to be tightened. To have small quantity of soap enema, as the bowels have not acted for some days, and there is still suppression of the lochial discharge. After the enema acts, to take an opium pill.

Friday, 17th,—visited about 10.30 A.M.—Found patient resting on her elbow attempting to take cornflour gruel,—she said that the enema had caused the bowels to act slightly. She had slept well, and perspired considerably during night. Feels herself "much easier."

At 5.30 P.M.—When passing looked in, and found that she had vomited twice or thrice since my morning visit. Complains of great pain in abdomen. Pulse, 104. To have another opium pill immediately.

At 9.30 P.M.—Vomiting ceased after taking the pill. Pulse same as at last visit. No discharge. To take tablespoonful castor oil, and repeat similar dose at 5 A.M. if first is not sufficient.

Saturday, 18th,—10.30 A.M.—Had vomited after second dose of the oil. Bowels had not acted. No discharge. To take one ounce castor oil, and continue turpentine stupes to abdomen.

9 P.M.—The oil had been retained in the stomach, but the bowels had not acted. If bowels do not act before 11 P.M., to have enema, and if patient is restless afterwards, to take opium pill.

Sunday, 19th,—morning visit.—Bowels had acted after enema. Patient feels much better. Abdomen less painful and less tympanitic. Pulse, 90. Skin moist.

About 7 P.M., on my return from visiting in the country, was informed that the patient, during my absence, had been greatly alarmed by the sudden occurrence of a severe pain and a profuse lochial discharge, and had sent for Dr Campbell, who kindly attended at once, and gave an opium pill. Now (7 P.M.) she feels comfortable. Occasionally she has pains resembling after pains; these bring away the discharge.

Monday, 20th,—morning.—Discharge continues. Bowels have acted. Abdomen bears considerable pressure without eliciting pain. To have bread-berry and barley-water during the day.

9 P.M.—Complains of great weakness. Bowels have acted four or five times since morning. Skin bathed with perspiration. Pain in bowels (evidently griping pain). Small, quick pulse. To have starch enema immediately. To take half-glass wine in water every three hours, and have quinine and iron mixture.

Tuesday.—Husband reports at 8.30 A.M. that patient had been very weak during night but was better then. Visited 10 A.M. Feels stronger. Thirst less. Abdomen almost painless. Bowels had not acted since enema was administered last night. To continue medicine and wine. To have chicken soup in addition to the other diet.

Wednesday, 22nd.—Patient improves; feels stronger. Bowels inclined to be relaxed.

Thursday evening.—Having been from home, I did not see my patient again till now. Since last visit she has suffered considerably from diarrhœa, and the lochial discharge continues profuse. To have starch enema, and continue wine.

Friday.—She feels very weak and uncomfortable, as the woman who attends her occasionally refused to give the enema. Called myself to see the attendant, and insisted on her giving the enema immediately.

Saturday.—Patient better; bowels had not acted since enema was administered yesterday.

She improved steadily from this date. At times the bowels were relaxed and painful, but were relieved by castor oil and chalk and catechu, given as required. On the 4th of June she got out of bed for the first time since her confinement, and was sitting alone by the fire-side when I called to see her. Up to that time there was no appearance of lactation. The mammary glands remained throughout flaccid and without secretion.

The main points of interest in this case are the following, viz.:—

1st. *The suddenness of the accident*, and its occurrence without any premonitory indications being present to lead us to anticipate an event so serious.

2nd. *The extent of the injury.*—The child had passed almost completely into the abdominal cavity, through the rupture, which was situated in the anterior wall of the uterus. On passing my hand into the uterus, I failed to reach any part of the child excepting the left lower extremity, and this part I found lying in a line above the symphysis pubis.

3rd. *The retention of the lochial discharge,* which it will be observed continued from the 15th to the 19th,—four days.

4th. *The beneficial influence of the solid opium* in checking vomiting, and in modifying the effects of the shock to the system.

Some time during 1869 the woman again became pregnant, and in February last she was attended in her confinement by my successor in Kildalton parish—James A. St. Clair, Esq., M.B., M.C., to whom I am indebted for the following report of the case as then observed by him. He writes:—"On the night her labour came on I was staying with a friend in Oa (four miles distant). She took ill about 9 P.M. on a Friday, and her husband did not come for me until 5 A.M. of Saturday. I got to Port-Ellen at 6.15, and found the patient in the following state: She was lying with her eyes closed, and was so weak that she could speak with difficulty. Her face was pale and anxious-looking; pulse small and thready, and so rapid that I could not count it correctly. She was vomiting incessantly, and her attendant told me that this had come on even before her labour pains, and continued as I then saw it. On examining the abdomen the child felt high up, and she had great pain on the slightest pressure being made anywhere over the abdomen. On making a vaginal examination there were several ounces of clotted blood on the bed; the vagina also was quite filled with clots. I required to introduce two fingers before I could reach the child, and I found the right shoulder presenting. Considering the very critical state in which the patient was, I gave her about half a wine-glassful of whisky, and proceeded to turn the child. I should have mentioned before that all uterine contraction had ceased before my arrival. The child was easily turned, and came freely until the head reached the inlet of the pelvis, where it remained fixed. I got the arms down with great difficulty, and then succeeded in passing my left hand along the back of the child's neck till I reached the head, which I found lying in the transverse diameter. I pushed the head back, and turned it first into the oblique, and second into the antero-posterior diameter, but through neither of them could I get the head to pass. The poor woman was now so feeble that I at once sent for my perforator and opened the cranium at the base of the skull or a little above it, and about the junction of the parietal and occipital bones. The brain escaped on making traction, and the child came away. Slight hæmorrhage followed the birth of the child, so I at once brought away the placenta. The uterus still remained flaccid. I introduced my hand into the cavity and removed a few clots, but still it did not contract. I then applied a few cold wet cloths suddenly over the uterus, and it contracted firmly, and all hæmorrhage ceased. The delivery took place about 8 o'clock A.M. I saw her several times during the day on Saturday, and the vomiting still continued, in spite of prussic acid, bismuth, and sinapisms to the stomach. On Sunday, about 10 A.M., all abdominal pain ceased, and she died in a state of syncope about 2 P.M. of that day. After death the abdomen was very much distended. No *post mortem* examination was made."

VI.—ON EPIDEMIC SCARLET FEVER.

By DAVID EASTON, B.A., M.D., *Stranraer.*

(Continued from page 167.)

Types.—The epidemic scarlet fever which prevailed in this locality about eleven years ago was throughout its course mild, with the exception of a number of cases characterised by great vascular excitement and severe throat complications. There was also a special tendency in the mildest forms to congestion of the kidneys, followed by albuminurea and dropsy. These symptoms, however, were generally under the control of appropriate remedies. During the whole epidemic there were comparatively few deaths. The last epidemic was remarkable for the mildness as well as for the great variety and virulence of its types. Almost every form which the disease has been known to assume prevailed to a greater or less extent. Fortunately upwards of eighty per cent. of the whole cases were of the simple and anginose forms, although for a short period during the epidemic, nearly a third assumed the malignant types.

Scarlatina Simplex.—The simple forms were usually ushered in gradually by slight chilliness, loathing of food, headache, slight sore throat, thirst, and considerable heat of skin, and not unusually by vomiting. The rash appeared about the second day, and was generally of a bright colour. In some of the very mild cases it was absent altogether, or it appeared only on some parts of the body in a discrete form. In the severer cases the rash was confluent, and usually darker, in proportion to the severity of the attack. The pulse was seldom very high. The rash began to fade from about the fourth till the seventh day, according as the fever had been very mild or severer in its character. As a rule, convalescence went on uninterruptedly from the time the rash began to decline.

Scarlatina Anginosa.—This form was ushered in more suddenly, and with greater violence,—frequently by rigors, vomiting, and severe headache. The constitutional as well as the local symptoms were more severe. The throat was much affected, and the glands often greatly enlarged,—so much so at times as seriously to interfere with respiration and deglutition. The rash was more abundant and of a darker hue, and there was frequently delirium present. But these symptoms, although serious, usually yielded to proper treatment, and the recovery was satisfactory.

Scarlatina Maligna.—When fatal, the fever usually manifested itself in one or other of the following forms :—

First Form.—In this form the disease commenced suddenly and with great violence, and terminated fatally in a few hours. The patient died, not from any vital lesion or serious complication, but from the direct effect of the fever poison; and so rapidly did death take place, that the rash had seldom time to make its appearance. In rare cases the chief symptoms were persistent vomiting and purging, while in at least two other cases death seemed to take place from some sudden affection of the brain. As illustrating this type of the disease, I shall give two cases in detail. I am indebted to my brother, Dr James Easton, for the following notes:—

J——, a young woman aged 21 years, was, towards the end of March, 1868, suddenly attacked with severe rigors, violent headache, followed immediately by bilious vomiting and purging. There was no tenderness or fulness over any of the abdominal viscera. The tongue was white, but soon became dry and parched, thirst urgent, breathing quick, pulse 160 and very weak. The skin, at first very hot, became in an hour or two cold and clammy. Everything swallowed was immediately rejected by the stomach. The amount of dark bilious matter vomited and passed from the bowels was very great. In spite of every remedial appliance the vomiting and diarrhœa continued till death. From the moment of seizure the prostration was most rapid. A few hours before death she much resembled one in the stage of collapse from cholera. Indeed, so much did the symptoms resemble that affection that a medical friend who also saw the patient was at first of opinion that she was suffering from British cholera. The history of the case, however, left no doubt as to its true nature. The patient the previous night had slept with a young sister, residing eight miles in the country, who was at the time suffering from one of the worst types of the fever. She walked home that evening in which she was attacked, and up to that time she felt as well as ever she did in her life. On a careful examination of the body before death, indistinct livid spots were visible under the skin. The patient succumbed to the influence of the poison after eight hours of suffering.

Dr M'Cormack, of Glenluce, has furnished me with the following notes of a case of the same type of fever:—

Was called to see J. B., aged 4½ years, on the 4th of February, 1868, at 11 A.M. Found him restless, depressed, drowsy, and stupid; eyes glazed; lips and tongue coated with a tenacious, brown-coloured secretion; throat inflamed, but not much swollen; there was a dark red eruption over the chest; also over the arms and legs, but not so distinct; a little over the brow, and scarcely any over the face. He was plied with stimulants and carbolic acid; but in an hour diarrhœa set in, and he sank at 4 o'clock P.M. on the same day. Three weeks previously the child had been removed from his father's house, in which there was scarlet fever, to that of his grandfather, a distance of ten miles, and remained well up to the evening preceding the day of his death; even then little or nothing appeared wrong, though he became listless about bed-time. During his residence from home, probably the only way by which infection could be carried was either by his grandmother or his father, who came and went betwixt the houses, and nursed the child occasionally. It is not probable that the poison lay latent for three weeks; neither is it probable that the quantity of the poison received into the system was large. Hence, the type of fever, in this case at least, would seem to be determined by the state of the constitution at the time. In conclusion, it is important to remark that the person who dressed the corpse conveyed the infection to a child that she nursed for a time, and that that child had scarlatina simplex, the eruption coming out three days after infection.

Other examples might be adduced, but these will suffice to indicate the nature of the symptoms of the toxic type of the fever, and the rapid course it runs. These cases also prove that a malignant form of the fever may impart to another either a similar type of the disease, or one of the mildest kind, and that malignant types may be communicated from a patient suffering from one of its simplest forms.

Second Form.—The second form which the fever assumed might be regarded as a combination of the toxic and congestive types, inasmuch as the patient died both from the direct effects of the poison, and from more or less congestion of the brain. It was sometimes more rapid in its course even than the preceding type, and usually as fatal, death taking place in a few hours after the first symptom of invasion. The disease was ushered in suddenly and violently, frequently with intense headache and vomiting—the latter generally disappearing in an hour or so; there was great heat of skin, the tongue coated and very red at the edges and tip, the pulse weak and very rapid, rising suddenly from 120 to 160, and sometimes even much higher. This sudden rise in the pulse was followed in an hour or two by paralysis more or less extensive, sometimes implicating the facial muscles, sometimes the extremities. The paralysis was in rare cases preceded by convulsions, but it was invariably succeeded by coma and death on the first day of illness. In some instances the patient survived till the eruption appeared. During the first day of the fever there might be nothing to indicate an early fatal result—the only alarming symptom being the exceedingly rapid and weak pulse, ranging from 180 upwards. The eruption was bright, natural, and well out, but soon became irregular and dingy in colour. The tongue, about the end of the second day, became very red, glazed, and parched; the throat was of a deep brown, but not swollen, and there was no difficulty in swallowing, till paralysis suddenly took place, the organs of deglutition being early involved. Coma, sometimes preceded by delirium, and then death, followed in rapid succession. The temperature of the body, from being very high, continued quickly to fall till the surface of the body became almost cold.

Third Form.—Another very fatal form of the disease was that in which there was a tendency to alarming hæmorrhage. I do not refer to those cases of an inflammatory kind, in which there sometimes is epistaxis, &c., of more or less severity, and which may be followed by alleviation of some of the symptoms; but I allude to that form of the disease which early gives evidence of its malignancy by the extremely rapid and weak pulse, the dry and brown tongue, the imperfectly developed rash, which soon assumes a dark purple appearance, with dark purple patches intermingled, the whole being apparently under the skin. The temperature at the commencement of the fever is very high, but as the fever advances it falls very rapidly. This type of the disease is, fortunately, of rare occurrence. I have met with two cases of it only. In the one case there was fatal internal hæmorrhage; in the other, which I saw on the day of its occurrence and fourth day of the fever, along with a medical friend, the blood flowed from mouth and nose, and stopped only when the patient had fainted. He was a young man, aged 19 years. There was no enlargement of the throat, which was dark red and congested, and he could swallow perfectly well. His pulse was very quick and exceedingly weak, his tongue parched and brown, and his teeth covered with sordes. The rash was like that of bad typhus, and had mixed up with it a number of dark purple patches the size of a shilling piece. On one arm and leg there were two large, dark, sloughing sores where the skin had been rubbed off by the patient during delirious excitement. The rash was dark from the first, and always kept under the skin. The whole surface of the body was cold and clammy, and seemed, from its appearance as well as from the peculiar odour it emitted, to be on the very point of decomposition. Even before death decomposition had in a manner set in. This also occurred in the other case referred to.

Fourth Form.—The most urgent symptoms were connected with the throat. There were early experienced great pain and difficulty in swallowing. The whole glands of the neck soon became swollen and hard, and the neighbouring tissues were gradually involved in the enlargement. The tonsils and fauces were much congested, and of a dusky appearance, and had scattered over them foul and angry-looking ulcers, with a tendency to spread; and these ulcers were frequently concealed by diphtheric deposits. The discharge from the throat soon became copious, purulent, of a dirty brown appearance, and giving forth an offensive odour. The nares by and bye became involved, and the discharge flowed from both mouth and nose, excoriating the parts with which it came in contact. As these symptoms increased the breathing and swallowing became more difficult, the pulse more rapid and weaker. The rash was generally copious and confluent, but very soon lost its bright appearance, becoming darker and darker, until it was undistinguishable from the dusky skin. The temperature, very high for the first day or two, became rapidly reduced. The tongue, from being thickly coated, became dark and parched, and frequently much swollen. The tongue and inner surface of the cheeks were at this stage of the disease occasionally studded over with small spreading ulcers, and the breath became extremely fœtid; the glands increased in size; deglutition became very difficult, food and drinks being rejected through the mouth and nose; and the breathing was rapid and oppressed. Great restlessness and anxiety prevailed, typhoid symptoms in their worst form gradually set in, and the patients' sufferings were terminated only in death, which generally took place between the third and sixth day. Such was the course of this form of the disease when unchecked by remedial agents.

Fifth Form.—This resembled the preceding, in as far as the urgent symptoms were connected with the throat, but was unlike it in as much as these throat complications did not manifest themselves till about the sixth or seventh day of illness. It was one of the most insidious in its approach, and the most disappointing in its results of all the types encountered during the progress of the epidemic. Happily, however, it was of very rare occurrence—two cases of it only having been met with in my practice, although I have known of one or two others. The fever usually commenced in a mild form; or, if the symptoms were at the outset severe, they soon subsided. During the first five or six days the progress of the case might have been all that could be desired. At the very time—about the sixth day—when there was every reason to predict a favourable termination (there being not a single unfavourable symptom present—not even a rapid pulse), the patient began to show slight uneasiness; he did not rest so well at night; the skin became hot and dry; the pulse more frequent, the throat sore, tongue dry, and thirst urgent. Now for the first time the glands and tissues of the neck were observed to be swollen, hard and painful to the touch. From that moment the local and constitutional symptoms became rapidly aggravated, and unless they were met and checked by energetic treatment, the case most likely ran an unfavourable course. As a general rule, the later in the disease the throat complications are in appearing, the greater the probability that these complications will be successfully encountered by suitable remedies. This rare type of the fever, however, forms a notable exception to that rule. It is, moreover, a proof that a form of the disease at first mild and favourable, might, owing to some peculiarity of the patient, become most virulent.

Sixth Form.—Another form of the disease shows the caution that ought to be exercised in giving a favourable prognosis, even in those cases which, during the first few days of the fever, seem to be doing well. The fever was ushered in by the usual symptoms—the pulse was invariably high, ranging from 130 upwards; the edges of the tongue were red and fiery, its centre thickly furred; the throat complications were seldom such as to occasion alarm. For the first few days the fever progressed favourably; the tongue began to clean; there was less congestion of throat, and no swelling; and deglutition was performed without difficulty or pain. The patient even enjoyed his food and rested well at night. The only suspicious symptom was the continued high pulse. About the fifth day, when the fever ought in ordinary circumstances to have subsided, suddenly and without any warning the voice changed. At first it became slightly husky, and then it was reduced gradually to a mere whisper. The pulse, with the change in the voice, rose rapidly; the tongue became red and parched, and the breathing more and more difficult. Deglutition, however, remained perfect; auscultation showed the larynx to be partially obstructed; this obstruction rapidly extended into the bronchial tubes. Unless the first approach of these symptoms was detected and successfully met, the case was hopeless; death took place in from ten to twenty hours after the first change in the voice. The symptoms towards the close were similar to those of croup. In some the membraneous deposit was seen extending to the fauces. In the majority of cases the throat presented no membraneous deposit whatever; it seemed to originate in the larynx, and thence to extend both upwards and downwards, and seldom did it commence in the fauces or tonsils.

We may describe a series of symptoms which give to some cases an alarming resemblance to malignancy, although they admit of a favourable prognosis. The patient, about the third or fourth day, became restless, and talked much during sleep. Sometimes he awoke with a scream, and in terror of something going to happen to him. By and bye he did not rest at all, but talked constantly, and occasionally became much excited, and attempted to get out of bed. He could, however, always be roused up, when he answered correctly any questions put to him. All the other symptoms were favourable. This peculiar restlessness and nervous excitement was the only suspicious symptom present, and the characteristic feature of this form; in a great measure it partook of the nervous type. The delirium much resembled that of *delirium tremens*. Although this symptom might occasion great anxiety to friends, yet, in the absence of the other symptoms which accompany the delirium of the malignant types, the medical attendant may with much assurance give a favourable prognosis. These cases readily yield to treatment, and usually do well.

Treatment.—The general treatment, *in the simple and anginose forms*, was of the simplest and most obvious description, and need scarcely be dwelt upon. It was directed to placing the patient in the most favourable circumstances for resisting the disease, to facilitating the elimination of the poison, and watching the progress of the case closely.

I cannot agree with those who affirm that *laxatives* are inadmissible in scarlet fever. On the contrary, if mild laxatives (not purgatives) are given early, unless contra-indicated by some unusual circumstance, they will prove of immense benefit. The bowels are often found to be much constipated, and the evacuations unhealthy. A judicious administration of aperients early in the disease, especially when the tongue is much coated, will not only tend to clean the tongue and remove from the bowels all irritating matters, but it will relieve the feverish symptoms and obviate the tendency of the kidneys and liver to become congested, and will thus prevent ulterior bad consequences, and in a great measure induce a healthy action in these organs. The aperient may be repeated at intervals if found necessary—due attention being paid to the strength and constitution of the patient.

Emetics were at one time held in great repute by the profession as a remedy in scarlet fever. Of late, however, they have fallen into disuse. This is probably owing to their abuse,—to an improper selection of cases for their administration, or to their being given in a too advanced stage of the disease. When given in suitable cases, and early, they form a valuable adjunct to the treatment of the fever. They not only clear the stomach, but in some measure reduce the fever, calm the general system, act upon the skin, and induce a more healthy action even in the kidneys themselves; and thus by increasing the natural secretions, they assist in the elimination of the poison. The emetic, however, should never be of a depressing kind, and should on no account be persevered in after the contents of the stomach have been evacuated. Those cases in which the tongue is very foul and white, and in which there is irritability of the stomach, are most likely to benefit by them.

It is of importance that the throat be early enveloped in hot poultices, or in wadding soaked in warm olive oil. These applications are soothing to the patient, and by excluding the air they go far to prevent the glands from enlarging, or if the glands do become swollen and inflamed they will go far to restore them again to their natural condition. A solution of nitrate of silver varying in strength from twenty to forty grains to the ounce of distilled water, is the only remedy I have found it necessary to apply, in this type of the disease, to the tonsils and fauces. Gargles are not much to be relied upon, for in the large proportion of cases the child cannot use them. It is seldom, however, that he will refuse to take a simple acidulated drink, such as diluted lemon juice sweetened with syrup. This will relieve the dryness of the throat, and otherwise act beneficially upon its inflamed surface. Ice is of great value. When sucked, it cools the tongue and throat, and reduces the congestion of these parts, and when swallowed in small pieces it soothes an irritable stomach. It may be given frequently.

The delirium which so often accompanies the anginose form will, as a rule, gradually yield to cold applications to the head. In exceptional cases it may be found necessary to apply a few leeches to the temples, but in very young children, it is much safer to trust to gentler measures.

As soon as desquamation has commenced, every part of the patient's body should be well rubbed over with olive oil, morning and evening. Every second night, when his strength will admit of it, he should have a warm bath, and during the bath the body should be well rubbed with bran so as to remove the loosened cuticle. This is not only grateful to the patient by removing in a great measure that disagreeable itching and heat of skin frequently so annoying to him, but it softens the usually hard and dry skin, keeps the cuticle from flying about in thin, powdery scales,—a fertile source of infection; shortens the period of desquamation, earlier restores the skin to its healthy state, and greatly obviates the tendency to catch cold, and thus prevents renal complications.

Should the patient be restless and sleepless, a few drops of Battley's solution of opium—the dose carefully graduated according to age, may be administered with benefit. It is better suited and more efficacious when the tongue is clean. When the skin is hot the body may be frequently sponged with tepid water and vinegar; this, too, is both soothing and grateful to the patient. Thirst is frequently a very troublesome symptom; the best drink is pure cold water, given frequently, and in small quantities, so as to avoid distension of the stomach—for that will cause sickness and derangement of the system. The chlorate of potash in solution (ʒi-ʒii to one pint of water), as recommended by the late Dr Graves, forms an excellent fever drink; or barley water, slightly acidulated with hydrochloric acid, may be substituted.

(To be continued.)

VII.—NOTES ON THE HYDRATE OF CHLORAL.

By ALEX. MAXWELL ADAMS, *Surgeon, 2nd Royal Lanark Militia.*

AN erroneous theory may possibly lead to the most brilliant practical results; and so it may be with regard to the introduction of the Hydrate of Chloral into medicine. The result in this case, no doubt, has been most brilliant and satisfactory; but I am strongly of opinion that we are indebted to an unsound yet beautiful theory for the practical discovery and application of this most invaluable therapeutic agent. Liebreich found that, by adding an alkali to chloral, chloroform was evolved; this led him to suppose that the same chemical decomposition would take place in the human body, owing to the alkaline salts in the blood producing the same result, and thereby inducing anæsthesia from within. Experiments followed, and we have now an hypnotic and sedative which, in affections of the head and nervous system, dwarfs every other known remedy of its class, and fills a blank in medicine which we have all felt and deplored. Thanks, therefore, to the theory; but is it sound? I think not. My own impression is that chloral acts as a whole, and that its action is more likely to be weakened by the decomposition in question than otherwise. I have seen 30 grains of chloral produce all its characteristic effects in four minutes. What quantity of chloroform is likely to be evolved within the body from such a dose, and in such a time? What amount does thirty grains altogether contain? Would either quantity, if taken by the stomach or injected subcutaneously, produce any of the effects peculiar to chloral? Is chloroform, when inhaled, not essentially transient in its action, and does it not for a time produce the most profound anæsthesia? What effect do medicinal doses of chloroform produce when given by the stomach? Contrast what we know of chloral with what we have long known of chloroform; examine the question from every possible standpoint, both practical and theoretical, and we come to the conclusion—at least, I have done so—that Liebreich's theory is a beautiful illusion, deserving, however, of immortality, as it has led him to the practical discovery of chloral—the greatest, since chloroform, of the age.

Although the mode of action of chloral may be involved in doubt, yet there can be none as to its value as a remedial agent, and I therefore beg, in the following rough notes, to briefly state the result of my experience, which has been somewhat varied, and has extended over a period of five months:—

As an Anodyne.—Chloral, as a general rule, will not alleviate severe and persistent pain where it fails to induce sleep, its anodyne and hypnotic action being, in a great measure, dependent the one upon the other. Where the functions of the brain are intact, and the dose is a medicinal one, the hypnotic action of chloral is rarely so profound as to destroy all feeling or means of communication from without; therefore the paroxysm of aggravated neuralgia, for instance, will often suspend the action of the largest dose of chloral which it is safe to give. I have had two such cases lately under my care. I have found both patients (females) susceptible to the influence of 20 and 25 grain doses, *during the painless intervals*, but have entirely failed with 40-50, and on one occasion with 60 grains, to produce any effect whatever, *so long as the paroxysm lasted.* Immediately upon its cessation, however, such doses took instant effect, two, three, four, and five hours after administration. Chloral, when it is not likely to be retained by the stomach, may be given as an enema with success.

CASE I.—I was sent for the other night to visit an old patient labouring under excruciating pain in the stomach, attended with violent retching and vomiting. For some years past I have had this woman occasionally under my care, similarly affected, and have always found the attacks to be most obstinate and distressing. On this occasion I ordered one drachm of chloral to be dissolved in a wineglassful of fluid starch, and given as an enema. She slept within thirty minutes, and awoke six hours afterwards feeling well and free from pain. The pain did not return. Although chloral has failed in my hands to afford much relief in severe outward pain, more especially of a neuralgic character, yet I have found it highly beneficial in many cases of internal pain, viz., of the stomach, bowels, bladder, womb, &c. Case No. I. is a fair sample, and I could give many. Chloral, however, upon the whole, is inferior to opium for anodyne purposes.

Chloral as a Hypnotic and Sedative in Functional and Organic Diseases of the Brain and Nervous System.—Opium is inadmissible in the treatment of many such cases, hazardous in some, and uncertain in all, often leading to results the very opposite of what was anticipated. The converse can be said of chloral—it is contra-indicated in no case where a sedative and hypnotic are required, and is safe and certain in all, leading to no other results save those anxiously looked for. We have stood by the bedside of many a sad case, have given opium—only to aggravate, however—and have been obliged in reality to leave our case to sink or swim very much in the hands of nature, assisted by powerful nurses, strait-waistcoats, canvas sheeting, &c. All this is changed since the discovery of chloral. No matter how wild the delirium, how acute the mania, how frightful the convulsions, we can now with almost positive certainty predict that there will in a very few minutes be calm repose. The following cases will serve to illustrate the above:—

CASE II.—Mrs ———, a fragile, delicate woman, was seized with *acute mania* four days after the birth of her first child. This was the most aggravated case of the kind it is possible to conceive, her struggles and cries defying all description. Gave two doses of bromide of potassium without benefit, then forty minims of Battley, which was repeated at the expiry of two hours, equally without result. I then put her under the influence of chloroform, thinking thereby to aid the opium in producing sleep, but still with no effect. I was now *hors de combat*, and could do little more than assist in the adjustment of sheets, for the purposes of restraint, as her head had been already shaved, ice applied, leeches, &c. This was on the 29th November, when chloral, as a therapeutic agent, was in its infancy. Having read an early notice by Liebreich regarding its efficacy, it now occurred to me to telegraph for a supply, which fortunately arrived in time to be of service, as my patient appeared to be *in extremis* when I administered the first dose —her extremities were cold, her pulse a mere vibration, and hardly perceptible at the wrist; but her cries and struggles continued unabated. I had, in fact, to extemporise a strait-waistcoat, as no manual force could keep her in bed. I administered 40 grains, and, as if by magic, in about five minutes she became quite calm and sensible, complained of great drowsiness, and within ten minutes fell into a profound sleep, which lasted for seven hours. Her pulse gradually gained in volume and diminished in frequency until it fell to 90 beats. She breathed rather quickly and heavily for the first two hours, but afterwards the sleep was natural and even light. Great drowsiness all next day; pulse improving; takes food, and is tolerably sensible. Towards night the mania returned with great fury; gave 40 grains of chloral as before, with exactly the same result—namely, an almost immediate return of calm consciousness, followed by a prolonged but natural sleep. I was obliged to continue the use of chloral at intervals, for about two months, in this case, and always with the same marked benefit. There was considerable retention of urine throughout, but she always voided it freely when under the influence of chloral. I soon came to know to a positive certainty that this would be so, and was often saved the necessity of using the catheter—a most difficult and dangerous operation in such a case. The bowels also, although very torpid at other times, frequently acted without medicine when she was under the influence of chloral. This patient is now quite well.

CASE III.—Mr ———, a farmer, aged 73, a man who had hitherto enjoyed perfect health, was found lying insensible on the floor on the 14th February, an hour after he had dined. This state of profound stupor lasted for about 40 minutes, when he fell into violent convulsions, which continued, with slight remissions, for nearly five hours, My friend, Mr Logan, was associated with me in this case. The temples were leeched, ice applied to the head, the bowels acted upon by enemata, and we then left him lying perfectly quiet, but in a state of profound coma. The pupils were contracted and fixed, face flushed, and the pulse slow and laboured. I found him next morning acutely maniacal, being kept in bed with the utmost difficulty by three powerful men. He had been in this state for eight hours. I gave him 40 grains of chloral, and in a few minutes his struggles and cries ceased, and we laid him down in bed. I found his bladder to be very much distended, and used the catheter; but before the instrument was withdrawn he fell into a profound sleep, which lasted, with interruptions, for 42 hours. The interruptions in question were, that during the course of this prolonged sleep he wakened up about every five hours, asked for a vessel in which to make water, voided it freely, took a drink, and dropped over again into a deep slumber. When I entered the house a few hours after this long sleep, I found him, to my intense astonishment, up, dressed, and reading the newspapers. He attended church and market for about a month after this attack, but is now paralysed and breaking up.

CASE IV.—I was called hurriedly, about a month ago, to visit Mrs ———, a highly nervous woman, who had been much annoyed for some time, and had passed many sleepless nights. I found her with a flushed face and quick, bounding pulse. At times she talked incoherently and struggled violently, at others became quite rigid, resting upon the back of her head and heels. I gave her 30 grains of chloral;

symptoms improved, but no sleep; gave her 30 grains more in an hour, when she slept in about four minutes, and wakened up eight hours afterwards quite calm and collected; no return of delirium.

CASE V.—*Delirium tremens*, complicated with *rheumatic fever*. Has not slept for eight days. Considerable delirium April 11th, 8 P.M.—Gave 30 grains of chloral. No effect. 9 P.M.—Repeated the above dose. 9.40—Sound asleep, and. slept continuously for *five* hours. Wakened up for a few minutes, and then slept calmly and soundly for three hours. April 12th.—Very drowsy all day, and has had broken snatches of sleep. Delirium quite gone. Got somewhat restless towards night. Ordered 35 grains of chloral. A few minutes after administration showed symptoms of *gentle intoxication*,—singing, &c. Was sound asleep in half-an-hour, and slept uninterruptedly for three hours. Had a good deal of broken sleep for many hours after. Patient now quite rational. No return of the delirium. This, and one other, are the only cases in which I have seen anything like excitement to precede sleep. The chloral was longer in acting in this case than in any of my other cases, but the result has been equally satisfactory.

CASE VI.—*Tubercular meningitis* of three weeks' standing in a child aged four. Has been convulsed for the last three days. April 11th.—Ordered five grains of chloral to be given with a little syrup and water every three hours, until a sedative effect was produced. Had three doses. Convulsions ceased after the second, and I found the little sufferer now lying in a peaceful sleep. April 12th.—A threatening of convulsions towards night. Five grains to be given, and repeated in three hours. Slept calmly all night, and was perfectly quiet all next day. Eyesight gone for days, and pupils quite insensible. April 13th.—Return of the convulsions. Ordered chloral as before. Same effect. Prolonged sleep, and a state of perfect calm enduring all next day.

I shall now consider the other cases in which I have used chloral with benefit. In severe *paroxysms of asthma* I have found it to relieve the spasm and to induce sleep. In *congestive bronchitis* it has proved equally beneficial in my hands. In such cases, from 20 to 30 grains may be given as a hypnotic and sedative. In irritating and exhaustive *coughs*, chloral may be given simply as a sedative in from 10 to 15 grain doses two or three times daily, either alone or combined with expectorants, as the case may demand. Chloral is quite a safe remedy in pulmonary affections, as it does not inspissate the mucous, tend to congest the lungs, stifle cough, or interfere with the play or action of the organ in any way. In several cases of asthma and congestive bronchitis I have induced profound sleep by a 30 grain dose, and in each individual case the patient has been able to sit up in bed and cough and expectorate, just as if he had been in a natural sleep. I have used chloral very largely in *whooping cough*, and can give it the highest commendation. In urgent cases it will often check the development of serious head and chest complications, by mitigating the cough and soothing nervous irritability.

Dose of Chloral, and Mode of Administration.—In all my urgent cases, I have given as much as 40 grains for a first dose, without observing any alarming or injurious effects, and, in the after treatment of such cases, have given as much as 60 grains, with a like negative effect as regards danger or injury to the system. Dr Russell, in his very valuable paper, in the February number of this *Journal*, has clearly demonstrated that 40 grains is an overdose in the treatment of the delirium of typhus; but I think that other cases will frequently present themselves to the general practitioner where 40 grains will prove the most efficacious first dose. The strength and constitution of the patient, conjoined with the severity of the symptoms, must, however, regulate the dose in a great measure. As a rule, 30 grains are usually sufficient to produce all the sedative and hypnotic effects peculiar to chloral, and if such a dose should fail, a second and similar quantity may be given within the hour. This is a safe mode of administration, by which you are enabled to discover, without risk, what quantity of chloral your patient actually requires, should it be necessary to recur to it again. Never give more than 40 grains for a first dose; never, I would say, give more than 60 at once under any circumstances, and be perfectly certain in your own mind, by previous administration and careful observation, that such a dose can be tolerated, in any case, before it is ventured upon. I generally give such doses in six drachms of syrup and six of water. The above remarks are applicable to serious and urgent cases, such as acute mania, *delirium tremens*, convulsions, phrenitis, and all similar aggravated forms of head and nervous affections. In milder cases, from 20 to 25 grains will generally soothe and induce sleep. For children the dose depends entirely upon the age. One grain for every year I consider to be a safe rule.

Dangers of Chloral.—In an overdose chloral is likely to overpower the brain and action of the heart. It is quite a safe remedy, however, if given with ordinary caution and judgment.

Therapeutic and Physiological Action of Chloral.—In most cases chloral induces sleep in from ten to twenty minutes, the patient dropping calmly and naturally into a deep slumber. The sleep thereby induced, save in exceptional cases, usually lasts from four to eight hours. I speak of continuous sleep. The sedative action of the drug, leading to drowsiness and snatches of sleep, is usually maintained for twelve or fifteen hours. You can raise your patient out of a chloral sleep to full consciousness almost at any time. Pain, or a strong desire to void urine, will often do this without your interference. Chloral does not constipate the bowels, paralyse the bladder, dry up the bronchial tubes, or otherwise interfere with the action of the respiratory organs, like opium; neither does it lead to any of its disagreeable after-effects, such as nausea, giddiness, headache, depression of spirits, &c. Chloral not only does not lead to torpidity of the bladder and bowels, but would appear, owing to some peculiar reflex action, to stimulate them to a more healthy condition where such a state of matters already exists. See Cases II. and III.

Chloral does not lead to congestion of the brain, and is therefore peculiarly applicable to the treatment of head affections. The pupils are always contracted, when there is no dilatation from other causes, under the chloral sleep. They immediately dilate, however, when the patient awakes or is roused. Chloral lowers the action of the heart and reduces the temperature of the body when such action and temperature are above the standard of health,—but in cases of feeble circulation I have found it to act as a gentle stimulant, restoring and equalizing the circulation throughout the outer surfaces of the body and extremities. The breathing is quickened for the first two hours, or thereabouts, after the successful administration of chloral, but it soon falls to what we are accustomed to see in natural sleep. The sleep of chloral is more allied to nature than that induced by any other drug, and comes on with much greater speed and certainty. Patients who have habituated themselves to the use of opium, and who are consequently unsusceptible to its hypnotic and sedative influence, are quite amenable to the action of chloral.

VIII.—CLINICAL REPORT OF CASES TREATED IN THE SURGICAL WARDS OF THE GLASGOW ROYAL INFIRMARY FROM MAY 1ST TO DECEMBER 31ST, 1869.

By GEO. H. B. MACLEOD, M.D., F.R.S.E., *Regius Professor of Surgery in the University of Glasgow, and Surgeon to the Royal Infirmary and Lock Hospital.*

THE following Report, which, from circumstances, I must make very brief, relates to a period of eight months,—beginning at the date when my last published record ceased,* and ending with the year 1869. The sanitary condition of my wards was most satisfactory during nearly the whole of that time, and the mortality low. Notwithstanding the considerable number of very severe cases admitted, we had no deaths for nearly three months. I do not think that our

* *Glasgow Medical Journal,* November 1869, p. 66.

present knowledge enables us altogether to decide in a definite manner what are the influences which determine those remarkable cycles of healthfulness and sickliness which are observable in a hospital. The fact that the whole house, composed of many wards, under distinct management, is in general more or less similarly influenced, would contradict the supposition that attention to the ventilation, cleanliness, crowding, &c., or even the nature of the cases treated had altogether to do with it. I do not for a moment deny but that such conditions as I have referred to must gravely affect the sanitary condition of a hospital or a ward; but what I often have had occasion to observe is that without any change in such conditions, periods of healthiness or the reverse occur which we cannot explain. To say the reigning influence is atmospheric is merely expressing our ignorance of the intimate cause. A most sudden change thus occurred in my wards during the period under review, and I found that it had pervaded more or less markedly the rest of the hospital. In a night's time a shadow seemed to have passed over the house, and from a condition of complete salubrity we passed for some days into a very contrary state, of which we had unmistakable evidence in sloughing in two cases, erysipelas in another, and rigors with symptoms of purulent absorption in another. This leads me to say that I have not been able to discover any appreciable influence on the sanitary condition of our hospital from the free use of antiseptics. During many months every case, with few exceptions, goes on well, whatever dressing is used, so long as the great leading principles of surgery are attended to; while, when a change for the worse comes, neither carbolic acid nor any other local agent has much effect—more fresh air, quinine, and more concentrated food being alone, so far as I can judge, of any benefit to the sick. The nature of the cases treated must undoubtedly greatly influence the salubrity of a ward. When many open wounds are constantly exhaling, the atmosphere, disinfect it as we will must assume a condition capable of greatly depressing the vital powers of those who breathe it, while, if we occupy the beds with chronic cases and only sparsely distribute the severer cases through them, we obviate one of the great dangers of a public hospital, but we also leave unfulfilled one of its most important functions—that of supplying succour to the greatest number. To contrast, as was recently done, the results obtained under the two systems can be of no service in helping to a true conclusion, though it may apparently tell in support of the local applications employed in the more favourable circumstances.

As regards carbolic acid as a surgical appliance, I am inclined to think that its value is wholly due to its preventing the dressings with which it is mingled becoming rancid, and thus causing irritation. We can thus leave dressings in place greatly longer, and so more effectually exclude the atmospheric air. I have used it largely and in several forms, and believe that to aid the closure of wounds it is an admirable agent. It keeps oil with which it is mixed for days sweet, and as no better agent can be got for hermetically sealing wounds than oil, we gain much by thus using it. Without the carbolic acid the oil would rapidly decompose and injure the wound; but with it days may go past, during which the dressings are left undisturbed. I have never obtained the almost entire freedom from suppuration described by Professor Lister, though sedulously seeking for its attainment by rigid adherence to all his precepts except the belief in the theory on which the practice is founded, and if implicit faith in that be requisite to perfect success, I fear I must abandon the search. Not a few of my cases (amputations and wounds) have done as well as it was possible for them to do without any local appliance except such as were requisite to keep the parts clean.

During the period embraced by this report 289 cases were treated in my wards, and, besides many trivial accidents, 44 (of such severity as would have justified their being taken into the wards if there had been room) were treated as outpatients.

Of this number 17 died; one was a fracture of the base of the skull; two were cases of internal injury by being run over by heavy omnibuses (one patient being a child, and the other an old man); one was a case of extravasation of urine, which came in just in time to die; two followed amputation of the leg for compound fracture, where operation at an earlier period was refused by the patients; one was a case of compound fracture of the skull and leg, followed by long exposure to the cold; another patient had several complicated fractures and internal injuries, from falling 40 feet into a quarry. Further, one died of secondary hæmorrhage 43 days after amputation at the shoulder, when the wound was cicatrized, and when he was naturally supposed to be out of all danger; one died after primary amputation of the thigh, another after amputation of the leg, and one after amputation at the ankle; one died of gangrene of the arm; an old man died of chronic disease of the bladder; one patient was transferred in a dying state from the medical wards; another took bronchitis and died when the wound resulting from the amputation of his penis was almost healed; and the last died of compound fracture of both bones of the leg, when, trusting too much to what the antiseptic method would do, I delayed amputation till I could no longer undertake it.

Such is a short *resumé* of the fatal cases; and such results cannot, I think, be thought discouraging when the eye is run over the following epitome of the cases treated:—

HEAD.

Fracture of Bones, ...	5
Concussion, ...	3
Severe Scalp Wounds, ...	6
Fracture of Lower Jaw, ...	1

NECK.

Chronic Laryngitis, ...	2	(One demanding Tracheotomy.)

TRUNK AND EXTREMITIES.

Simple Fracture of Clavicle, Ribs, or Bones of the Extremities, ...	53
Fracture of Pelvis, ...	1
Compound Fracture of Upper or Lower Limbs, ...	24
Fracture of the Spine,... ...	1
Concussion of the Spinal Cord,	1
Dislocation of the Larger Joints,	9
Chronic Cystitis, ...	2
Incontinence of Urine, ...	1
Retention of Urine.	2
Extravasation of Urine, ...	1
Enlarged Prostate, ...	1
Hæmatocele, ...	1
Hydrocele, ...	2
Syphilis in its Various Stages,	8
Orchitis, ...	1

Necrosis of Long Bones, ...	7
Caries of Carpal or Tarsal Bones, ...	2
Smash of Hand, with Loss of Parts, ...	27
Smash of Foot, with Loss of Parts, ...	7
Tumours of Various Parts, ...	7
Disease of the Greater Joints,	26
Severe Lacerated Wounds, ...	13
Hernia, ...	1
Calculus in Urethra, ...	1
Burns, ...	17
Stricture of the Urethra, ...	11
,, Rectum, ...	1
Prolapsus Ani,...	1
Fistula in Ano,...	7
Piles, ...	1
Large Chronic Abscesses, ...	10
Erysipelas, ...	5
Severe Bruise of Various Parts,	23
Ulcers, ...	8
Local Inflammations, ...	4
Epithelioma of Lip or Penis,...	6
Affection of Bursæ, ...	2
Lupus, ...	1
Neuralgia, ...	2
Phymosis, ...	2
Limited Gangrene, ...	3
Carbuncle, ...	2
Stab, with Division of Important Vessels, ...	1
Painful Stump, ...	1
Gonorrhœa, ...	2
General Struma, ...	1
Various other slighter affections,	6

The following were the operations performed during the same period:—

Tracheotomy, ...	1
Amputation at Shoulder, ...	1
,, of Upper Arm, ...	3
,, of Penis, ...	1
,, of Femur, ...	3
,, of Leg, ...	3
,, at Ankle, ...	2
,, (Partial) of Hand, ...	11
,, ,, of Foot, ...	1
Excision of Head of Humerus, ...	1
,, of Elbow, ...	1
Fistula in Ano, ...	5
Excision of Tumours, ...	5
Removal of Portions of Lower Lip, ...	3
Removal by Incision of Calculus in Urethra, ...	1
Necrosis of Tibia, ...	5

All of these were successful except a primary amputation of the thigh, performed during my absence by one of my colleagues, in a case where there were several serious injuries, followed (before admission) by prolonged and exhausting hæmorrhage; the amputations of the leg, and one of those at the ankle. The leg amputations were all at the knee, and in two of the three cases the limbs were so utterly smashed by heavy weights falling on them that primary amputation was clearly required, had the patients not refused their consent; and when rigors and sinking set in, the operation was performed only at their urgent solicitation. The third case I blamed myself for trying to save at all, and the operation was performed too late to succeed. The amputation at the ankle was by Syme's method, and is the only one I have lost up to this date (April, 1870) out of 54 cases.

Of the cases of head injury some were very interesting. Nearly all arose from falls down stairs, or from a height, when the sufferer was drunk. It is certainly most lamentable to see so many valuable lives annually lost in this city from the immediate effects of intemperance, and if it were possible to sum up those who die, or are permanently injured, from the same cause, it would exhibit in all its hideous proportions this most grievous of social plagues. In many of these cases it is not easy to say on admission how much of their condition is due to alcohol and how much to injury; and it requires much care to avoid falling into error and failing to recognise the true cause of the unconsciousness, &c.

G. J., aged 27, a cab driver, admitted July 8, at 2 a.m., in a state of complete unconsciousness, having been found lying at the foot of a steep stair, down which he had fallen when drunk. He had all the symptoms of profound shock. There was free bleeding from his right ear, which lasted for four hours after admission. It was not known how long he had lain after his fall before he was found. There was no wound or other lesion of the head discoverable. Heat and friction were applied to the surface, and he was watched carefully, with orders that if reaction did not set in, a drachm of aromatic spirit of ammonia in two ounces of water was to be thrown into the rectum. This I have always found to be the safest and most efficient method of managing this stage. We wish reaction to be established without violence or excess, and in general external heat suffices; but if more is required the diffusible stimulant by enema greatly helps. He came round slowly, vomiting as consciousness returned. That vomiting, when thus occurring, is useful in re-establishing the circulation, there cannot be a doubt; but all are now agreed that to adopt the course recommended by Hennen, of administering antimony in order to imitate this "effort of nature," is highly dangerous, both on account of the depressing effect of the drug in the first instance, and the injurious influence on a possibly damaged brain of the excessive straining apt to be set up.

A few hours after consciousness was restored the patient had a convulsion, and as his face got flushed and his pulse full and rapid, his head was shaved, a blister applied, and afterwards cold. He had been freely purged, and his bladder attended to. It was found, so soon as the insensibility had passed off, that his lower limbs were almost completely paralysed, and he was unable to micturate.

Next day he was stupid and giddy, and this state, with some delirium, continued for some days. He was kept on milk diet, and his bowels and bladder carefully looked after. The bleeding from the ear was not followed by any watery effusion. There was no ecchymosis of the eyeball. The pupils continued contracted and very slow of action. Voluntary micturition returned on the third day. His bowels were very difficult to regulate, and twice, when 36 hours passed without a motion, his symptoms became greatly aggravated; but so soon as a free purgation was effected he mended. Gradually he got quite well, though suffering at times from lightness in the head and headache, which were always augmented if his bowels were not freely opened. Another fly blister to the vertex was of much service in restoring him.

In the above case we had free bleeding from one ear, continuing for some hours, but not followed by the escape of any clear fluid. It was thus in no way distinctive of any special lesion. The close sympathy which exists between the brain and the alvine discharge was well illustrated.

In another case which recovered well we had somewhat prolonged bleeding from the nose.

In the following case of punctured fracture of the mastoid process, there was very prolonged and severe bleeding from the corresponding ear, evidently, however, quite local.

J. C., 40, labourer, fell from a height among broken masses of iron. When admitted he had all the symptoms of compression of the brain, and free bleeding from the right ear, behind which there was a small wound leading to a limited depressed fracture of the mastoid process. I did not see this patient till next day, when he was conscious, and his worst symptoms had passed off. He had been purged with croton oil, and cold had been put to his shaved head. His bladder had to be relieved by catheter. The power over his legs was very feeble. The bleeding from his ear lasted for four days, and was not followed by any watery discharge. He suffered a good deal from pain over the right side of his head, and this was always relieved by blistering the vertex, which was three times repeated, very much by his own desire. He was discharged well. The fracture here evidently only implicated the mastoid cells, and so did not demand any operative measure; but the amount of bleeding which followed was very remarkable.

The following is a good illustration of "Cerebral Irritation" following injury:—

J. K., aged 72, fell down a stair on his head, which, however, was uncut. He was intensely collapsed on admission, being as nearly dead as it was conceivable to be. By persevering efforts he slowly rallied, and passed into the following condition:

His surface was cold, and his pulse slow and feeble. He always lay on his side, and rolled up like a ball, every limb completely flexed, and his head bent forwards. He kept his eyes closed, and the bed-clothes over his head; the pupils were always contracted. He was restless, and tossing about, and was much annoyed if he was spoken to or disturbed. He retained the power over his sphincters. He would lie thus for days answering questions snappishly, and keeping his eyes closed when not roused. He breathed quietly, and took food when it was offered to him. He was simply kept warm and well fed. His bowels acted sufficiently, and all active treatment was clearly uncalled for. A blister was applied with advantage to his head, and latterly I gave him a small amount of stimulant. Bromide of potassium appeared to be of some use in allaying restlessness. No manifest improvement took place for 16 days, and then he gradually began to amend. His pulse rose and got firmer, he was no longer irritable, his pupils began to expand, and his heat to become natural. He stretched himself in his bed, and took an interest in ward affairs, but when he left the hospital he was in a silly, weak mental condition, though his bodily health was restored.

The probability is that we had here some laceration of the brain, which will, at his time of life especially, never be wholly repaired.

The following case was a most remarkable one, from the almost entire absence of symptons indicative of serious lesion.

D. M'P., 40, labourer, admitted 18th Dec., having fallen into the hold of a ship, a depth of 30 feet, and lighted on the crown of his head. He was insensible, with slight stertorous breathing, on admission. His pulse was good. There was a scalp wound surrounded by much bruising on the vertex, but no apparent injury to bone there. The left eye was destroyed, and the *lids* of the right were ecchymosed. There was no blood beneath the ocular conjunctiva of that eye, nor was there any bleeding from either ear. The nasal bones were driven down upon the face, and had to be elevated. There was slight bleeding from the nasal cavity.

In 24 hours he had become conscious, though a little stupid. He micturated freely, and his bowels acted naturally. He complained of his head being sore, but otherwise felt well. He had complete power over his limbs, and the only symptom which arrested my attention particularly was deafness on the left side, which had been marked since the accident, and of which no external explanation was found. The existence of this condition, taken in connection with his mode of fall, led me to fear fracture of the petrous bone, yet the absence of any confirmatory sign gave some hope. There was no facial paralysis whatever. A renewed careful examination of the vault of the skull failed to discover any evidence of fracture of the bone.

For seven days no important change took place. He appeared to suffer most from the occasional closure of his nostrils by secretion. He complained little of his head, where the scalp wound was healing kindly. He would have eat more food than he was allowed, and his functions were all naturally and healthily performed.

He slept on the whole quietly, but would occasionally awake startled and wish to get out of bed. On the 7th day he had some vomiting of glairy, bilious fluid, and this disturbed and annoyed him. He could take no food, and he was observed for the first time to pick the bed clothes, and raise his hands restlessly to his head. He was, however, quite conscious, though dull. The deafness continued. No paralysis of the limbs.

Such was his condition at 2 A.M. on the morning of the 8th day. When I saw him at 9 o'clock, I found for the first time ecchymosis beneath the ocular conjunctiva of the right eye. It had appeared in the course of the morning, and was intense and spread backwards beyond our reach. The pupil, however, responded readily to light. His left side was also found to be, for the first time, paralysed, and he was duller and more difficult to rouse than before. He got gradually drowsier, and died comatose late the same night. Now observe what was the "*post mortem*" condition found. There was ecchymosis of both temporal muscles. No fracture of the vault of the skull. A layer of pus existed about the thickness of a sixpence below the dura mater all over the surface (superior and inferior) of the brain, and some thick lymph-like masses lay at the base. The base of the skull was found to be almost split in two. Starting from a point a few lines distant from the foramen magnum, a wide fissure ran forward in the middle line to the sella turcica, where it divided, like the limbs of the letter Y, into two branches, which passed across the sphenoid and the orbital plates of the frontal bone on both sides, reducing them to fragments, and on the left side causing considerable displacement of the fragments. Passing off from this main line of fracture were several lateral ones, by which the petrous portions of both the temporal bones were broken across, and on the right side the articulation between the great wing of the sphenoid and the temporal was quite severed. The cribriform plate of the ethmoid was broken into small pieces, and the nasal bones destroyed. The amount of blood found within the skull was remarkably small, but pus was effused everywhere.

How curious it was to find such a state of things, and yet such an absence of symptoms! No bleeding from the ears, or mouth, or into the tissues of the neck, or, till the last, into the orbit. No paralysis, and little loss of consciousness. Truly, "Head cases are the most puzzling of all surgical ailments."

Finally, as regards head injuries, I would shortly relate the following, as an example of the wonderful power of recovery from such lesions shown by young children. Such instances are far from being uncommon. In private practice I have met with several still more striking ones.

M. M., aged 5, admitted August 17th. This young child had fallen over a window two floors high on to stony ground. When taken up there was bleeding from the nose and right ear. The former shortly ceased, but the latter continued for some hours after she was brought into the Infirmary. There was complete unconsciousness, widely dilated pupils, quite unaffected by light. She breathed loudly and quickly. The surface was of a good temperature. A pulsating swelling about the size of a large hen's egg existed over the right parietal. The scalp was uncut, and no injury was found in the limbs or trunk. On careful examination of the swelling on the head two small openings were seen, from one of which a minute portion of brain matter oozed. Cold was applied to the head, and the bowels were unloaded, but beyond this nothing was done. Next day it was distinctly observed that the left side of the body was powerless. The pupils, though much dilated, gave some reply to the stimulus of light. The swelling on the head had ceased to increase, and the pulsation was much less marked. She swallowed milk when it was offered to her.

Without unneccessary detail, I may say that in ten days recovery was well advanced. Consciousness returned fully on the 5th day. The tumour gradually disappeared, as did the paralysis, and when dismissed on Sept. 7th, she was in all respects well.

The simpler the treatment of these cases the better. Active interference is most injurious. The softness of the bones, their elastic connection, and the more free expansion allowed the brain in young children, saves them from much of the risk ran by adults. Even in cases of severe fracture, with depression (of which I have seen a good number), I believe that non-interference is the best procedure. The absence of the sinuses and of diploe allows of the brain being easily reached by a blow, but still, if time is only given (supposing always that fragments are not actually driven into the brain), I unhesitatingly believe that these young patients have a much better chance by being left alone than from any operation. If space allowed I could easily illustrate this. In another patient, aged 12, admitted in June, a considerable part of the left parietal bone was wholly removed by the blow from a cart tram falling on him. The brain was freely exposed, yet by simple treatment and non-interference,—beyond guarding him against sources of irritation, and attention to his general health, he made a perfect and uninterrupted recovery.

The following instance of recovery after a most serious injury of the chest is instructive.

J. S., a carter, aged 36, admitted July 16th. An unmanageable horse crushed him against a wall, running the end of the cart tram with great force against the left side of his chest, just above the heart. He felt his ribs give way, and thought the tram had passed through his body. He was much collapsed, and was sent after reaction to the hospital by my friend Dr Renfrew. He had some (though not severe) hæmoptysis, and was very breathless and weak on admission. When warm in bed he gradually revived; but dyspnœa and a tickling cough caused him much annoyance. The hæmoptysis shortly ceased.

I saw him next morning. He had a flushed face, somewhat livid lips, rapid and full pulse, much cough (accompanied by great pain in the chest), and dyspnœa, with a good deal of restlessness. He had a firm bandage round his chest (put on after admission), which I at once removed. To the left of the sternum, and just above the heart (which was displaced somewhat downwards and to the right side), was a marked hollow, where several ribs were felt broken, and which region rose and fell, so as to form a prominent swelling and a hollow, during the act of respiration. The whole left side of the chest and neck was emphysematous. This condition also existed behind, and extended down to the false ribs. There was no respiratory murmur over the lower half of the left lung. By removing all constriction, and placing him in the sitting posture, he was greatly relieved; and infusion of digitalis in half ounce doses every three hours had a most marked and satisfactory effect on all his symptoms. His pulse next morning had fallen to a healthy standard, he had slept well, could breathe without distress and with little more than normal frequency, his face had lost its livid and anxious look, and he expressed himself as being greatly relieved. The digitalis was continued for some days at longer intervals, and with careful observation. His secretions acted naturally and he steadily mended. The left side of his chest was supported by stripes of adhesive plaster, passing from the spine to the sternum, and leaving the right side free. The hollow gradually disappeared; the heart resumed its normal position; some effusion which had been present into the left side of the thorax was absorbed; the emphysema subsided; and when he left the hospital on August 13th he was quite recovered, there being only a slight hollow on the left side of the sternum over the third, fourth, and fifth ribs. The breathing was quite free, percussion clear over the injured side, and the fractured bones firm.

If the skin had been torn in this case how different would have been the result! The good effects of digitalis were very decisive.

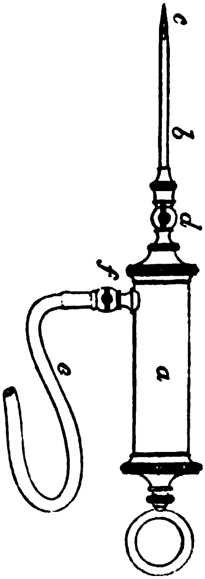
Of compound fracture of the femur we had four cases —one demanded amputation; three saved their limbs. Fourteen compound fractures of the leg (some extremely severe) were treated; ten recovered with good limbs. Three compound fractures of the humerus and three of the fore-arm also did well. In all of these cases the early closure of the wound by various agents (carbolic acid and oil; sulphurous acid and glycerine; collodion; lint dipped in camphorated spirit of wine, &c.,), and the careful "setting" and fixture of the fragments, together with the early and careful support of the patient's strength, were the main features of the treatment. Pus had frequently to be evacuated, and as a rule I gave quinine freely and from an early date.

Of the cases of stricture some were remarkable for the rapidity and ease with which old contractions were got quit of. J. T., gamekeeper, aged 45, had suffered from traumatic stricture for 18 years. He had been six weeks under Mr Syme, treated by gradual dilatation before a No. 10 could be passed. From neglecting to use a bougie, the contraction had recurred, and when he came in I could with difficulty pass a No. 2 under chloroform. Holt's instrument was passed a few days afterwards, and a No. 12 at once introduced without pain or annoyance.

In another patient,—himself a surgeon,—Mr Syme had had very great difficulty in passing any instrument, and that only with violent hæmorrhage and most severe subsequent urethral fever. He did not improve while being treated in Edinburgh. This stricture was 20 years old, and was very tight. The slightest attempt at passing an instrument along the canal occasioned violent shiverings and fever. His left testicle was much enlarged and tender, and his general health out of order. Having got his digestive organs into an improved condition, and put him under chloroform, I passed Holt's dilator, and afterwards put him on free doses of quinine and morphia, with brandy and nourishing food. To his own astonishment, he had no approach to urethral fever, slept well, and had little annoyance from his stricture. The testicle became painless and diminished gradually in size as the contraction of the urethra was cured. Its improvement was much aided by a practice which I have pursued for several years with most satisfactory results in severe orchitis, viz., puncturing the tunica albuginea with a grooved needle, and drawing off the serous fluid. I have never found any harm to arise from the practice, and the rapidity of recovery is remarkable. In another case (an acute one connected with gonorrhoea), in the wards at the same time as this patient, the effects of this practice were strikingly useful.

This patient left the hospital able easily to pass a No. 10 bougie without any constitutional disturbance, and with a marked amendment of his general health.

For some time back I have been employing a trochar made for me by Mr Hilliard, on the same principle as the stomach pump, which has proved most useful for the removal of large quantities of pus or other fluid. By its aid I have evacuated several large psoas and lumbar abscesses, also dropsical fluid from the knee joint; and as it effectually excludes all atmospheric air, it is capable of being turned to many useful purposes. By reversing the action, any kind of injection can be thrown into the cavity, and the sac can also be most effectually washed out. The accompanying drawing will best explain it.

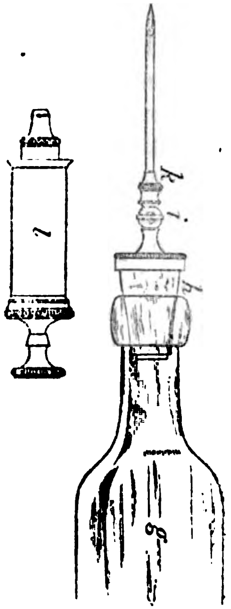


a—Brass syringe, with very accurately fitted piston; *b*—

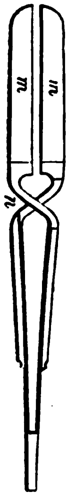
hollow steel needle, with pen point *c*, which has a well-fitted cock at *d*, and can be disconnected close to and distal to that point by unscrewing; *e*—an elastic side tube, closed by a cock *f*.

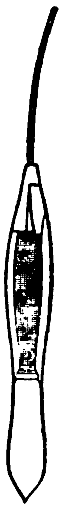
When used, the steel needle is inserted through the skin (previously rendered insensible by the ether spray) at some distance from the sac of the abscess, and pushed along the cellular tissue into the abscess. The cock at *d* is then opened, and the piston slowly drawn out, by which the fluid is drawn into the barrel *a*. When the barrel is full, *d* is closed and *f* opened—the end of *e* being placed in a basin of water, and the piston pushed home when all the fluid will be ejected. The cock *f* is then closed and *d* opened, and so the process repeated till it is known by the piston refusing to be withdrawn that all the fluid is evacuated. If it is wished to inject the cavity, the end of tube *e* is placed in the liquid to be used, and then the action above described is reversed. As the needle is carried some way subcutaneously, a little pressure, first with the finger, and afterwards with a small pad over the tract, when the needle has been withdrawn, will effectually exclude the air. Though I have repeatedly used this syringe to evacuate large quantities of pus, I have never seen the smallest constitutional disturbance follow.

Mr Hilliard has also made for me the following modification of the arrangement, and it too acts admirably. *k* is the same hollow needle screwed into a cork *h*, which accurately fits a soda-water bottle *g*. By unscrewing the needle, and fitting the small brass exhausting syringe *l*, the air is rapidly pumped out of the bottle, and the cock *i* closed. The needle is then screwed on and introduced into the abscess as before, and when the cock is opened the pus at once rushes into the bottle.



As I have received several communications regarding the forceps I mentioned in my last report for commanding bleeding and giving better hold of the flaps in the operation for hare-lip and epithelioma of the lip, I append a wood-cut of them.





They are of steel, and the blades *m m* are curved (as shown in the profile view), and can be bent to any desired curve. The spring handles *n* keep the blades in close and firm contact (they are here represented slightly open.) When pressed open, and the lip caught between the blades, the bleeding is entirely commanded, and an assistant can, by holding the handles, approximate, or hold separate either lip of the wound. At first I used the curve of the blade to guide the stroke of the knife, but I soon found this not to suit, as the instrument is then apt to slip off; but when it is kept well back from the line of incision it entirely prevents hæmorrhage, steadies the tissues, so as to allow of more even incision, and gives your assistant the power of neatly and rapidly approximating the edges when sutures are being introduced. These sutures are easily passed between the blades without disturbing them, so that the whole operation is rapid, and almost bloodless. For the interrupted suture I have for some years frequently employed a stout steel wire having a straight spear-pointed needle firmly soldered to its end. By taking the temper out of the wire at such intervals as you desire length of pins, you can cut it with pliers so soon as it is in place. This saves carrying, and having the trouble of introducing, a number of separate needles, as one long piece of wire (6 or 8 in.) suffices for many sutures, and it is much more quickly and easily introduced, besides being much cheaper than needles.

IX.—SHORT COMMUNICATIONS.

1.—Liebreich's Theory of the Action of Chloral, *by* James B. Russell, B.A., M.D., *Physician to the City of Glasgow Fever Hospital.*

In my paper on *Hydrate of Chloral as a Hypnotic in Typhus* (February No., p. 209), I stated that if the action of chloral, as Liebreich asserts, depends upon the alkalinity of the blood, then typhus, being a disease characterised —in its more advanced stages, at any rate—by increased alkalinity of that fluid, "the physiological effects of chloral ought therefore to be developed in a typhus patient with smaller doses, and with greater rapidity."

This hypothesis can be established only on a basis of both difficult and tedious observation and experiment. With the valuable co-operation of my assistant, Mr M'Kellar, something has already been done in the investigation, but not sufficient to warrant any distinct conclusions. Our experiments give undoubted confirmation to the accuracy of Liebreich's general theory. (1) M. Personne's observation that chloroform is evolved from a mixture of chloral and blood has been confirmed by experiments, both with healthy and with typhus blood, the chloral having been previously tested by a blank experiment. Mr M'Kellar relied on the precipitation of silver chloride by the ignited vapour, the principal method employed by M. Personne, and the same which has been long used to demonstrate chloroform in the tissues after its administration as such. Though conclusive when the result is negative, it does not distinguish chloroform from chlorine itself and other chlorinated compounds, and therefore, in concluding that chloroform is present, it is presupposed (in this case, however, with an approach to certainty) that such other substances are absent. (2) The only experimental attempt to disprove Liebreich's theory, so far as we know, has been made by Dr Arthur Gamgee (*Pharm. Journal*, Feb., 1870), who asserts that the alkaline salts of the blood—viz., bicarbonate and alkaline phosphate of sodium—will not yield chloroform from chloral, the former at a temperature under 70° C., the latter even at the boiling point. Mr M'Kellar, on the contrary, finds that the bicarbonate and officinal phosphate (much more the alkaline phosphate) of sodium give, with chloral at 40° C., *a most abundant precipitate of silver chloride.* In the absence of details of the method of analysis followed by Dr Gamgee, it is impossible to account for this discrepancy of result. (3) Towards the quantitative comparison of the evolution of chloroform from typhus and from healthy blood we have not yet done anything. (4) The clinical aspect of the question also awaits further development. The conditions of accuracy are very complex in comparative experiments on the effects of drugs in different individuals, and become still more so in different diseases. Dr Liebreich has expressed great interest in the supposition that typhus patients are more susceptible to chloral than those suffering from other diseases. In a letter dated 3rd April, he states, regarding his theory, that "of its accuracy he is more and more convinced from more recent investigations." He kindly offers to facilitate our inquiry by providing us with chloral of ascertained uniform strength, thus meeting one essential condition of any comparative inquiry into its action. We hope, therefore, to be able to perform during the summer some trustworthy and exact experiments.

2.—HEREDITARY MALFORMATION OF EXTREMITIES, *by* P. H. M. M'KELLAR, M.A., M.B., *Resident Assistant, City of Glasgow Fever Hospital.*

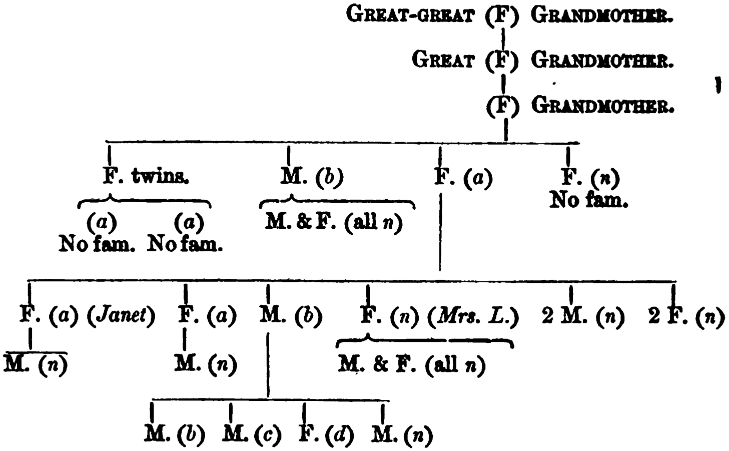
THE following remarkable history of hereditary malformation was suggested by the condition of the digits in a patient, Janet ———, aged 28, admitted to the Hospital in March last. The facts were obtained from Mrs L., her sister, also under treatment at the same time. An independent statement was taken from Janet herself, and as it agreed in all essentials, there can be no doubt of the accuracy of the chart showing the hereditary nature of the deformity given below. The following is the description of the malformation as it exists in Janet.

The four minor digits of both hands are quite normal; the practical representatives of the thumbs are normally opposible and useful, with the angle between each and the forefinger normal, but have the general appearance of fingers, and possess each a metacarpal and three phalangeal bones. Each of these "thumbs" has a rudimentary offshoot on the external lateral aspect, that on the right hand arising by an apparently cartilaginous connection opposite the distal joint, and consisting of two portions admitting of passive motion; that on the left is somewhat similar, but is longer,—arises by a distinct and partially movable joint from the metacarpo-phalangeal articulation, and consists of three portions, distinguished by nodules at the joints, which seem to be anchylosed. Neither offshoot has a distinct muscular apparatus or power of motion.

The four minor digits of each foot are normal. The first metatarsal bone is provided with two digits, arising separately, but intimately conjoined,—capable of supporting the weight of the body. On both feet the lateral digit has the usual size, appearance, and two phalanges of a great toe; the neighbour of each is smaller, and has certainly two phalanges, probably three, with anchylosis of the proximal joint. On the right foot they are webbed to root of nails, but distinguishable for half-an-inch higher up, and have a perceptible independent motion; on the left they are conjoined as far as the margin of the nails, and have no independent motion.

The following chart shows the remarkable hereditary nature of the malformation. The variations of the deformity in the individual are indicated by letters, thus:—

(*a*) both thumbs and great toes double.
(*b*) both thumbs double; both toes normal.
(*c*) right thumb double; other thumb and toes normal.
(*d*) one thumb alone double; uncertain which.
(*n*) both thumbs and great toes normal.



This diagram exhibits the transmission of the malformation through six generations, if the traditional account of its occurrence in the two remoter members be received. There is a family belief that it has been conveyed by the females only, and has never been attributable to any father, except in the one instance specified.

Reviews.

I.—LECTURES ON SURGERY. *By* JAMES SPENCE, F.R.S.E., *Professor of Surgery in the University of Edinburgh, Surgeon to the Royal Infirmary and Lock Hospital, &c., &c.* Parts I., 1868; II., 1869. Edinburgh: Adam & Charles Black.

STRONG inducements are not wanting to teachers to publish the lectures they are in the daily habit of delivering, but it were well to remember that their own inherent value is, after all, the only legitimate reason for their being given to the public, as it will assuredly be the only guarantee of their favourable reception. For evidence of such value we have sought in the lectures before us, and have to confess that the search, though begun with no unusual expectation, has ended in disappointment. Indeed, we are at a loss to understand why Mr Spence should have published his lectures at all, since it must be apparent to all who read them that they will neither confer laurels upon him nor great advantage upon others, whether students or practitioners. They profess no special aim, and certainly supply no want; they give us no new information, and the old—and much of it is very old—in an unattractive, and too often in a fragmentary form. Their style is indifferent, their composition careless, if not at times incorrect.

The mode in which the lectures are published was adopted in order to render the work available for students attending Mr Spence's class during the past winter. The third and concluding part, on "Special Operations and Regional Surgery," has yet to appear; the two parts before us treat respectively of "Diseased Action and External Injuries," and "Diseases and Injuries of Special Structures." They are beautifully printed, in clear type, and are singularly free from errors of the press, but we doubt whether the numerous and somewhat pretentious illustrations scattered throughout them will tend to enhance their value, except it may be in the eyes of the inexperienced student. We take it that an illustration in a work of this kind should fulfil at least two conditions; it should be faithful to nature, and should teach some distinct and more or less valuable lesson. In both of these respects, many of the drawings in this work will be found wanting.

The subject of inflammation—and no one can exaggerate its importance to the student making his first step towards the study of disease—is dismissed in twenty pages; and yet, after perusing them, the reader may be inclined to quarrel less with the brevity than with the character of the teaching of this part of the subject. The doctrines put forth are meagre in their exposition, and what is worse, antiquated, and, to our thinking, erroneous. One can hardly read them and believe one is reading a recent publication, so little has the author acquainted himself with the later and abler writers on the subject, or so little does he choose to follow them or even to quote their opinions; and what is true of this part of the work is true of all the pathological writing it contains. In the outset, the four Celsian "notæ inflammationis" have a most prominent place assigned to them. "A part is said to be inflamed when it presents the following characters:—Redness, heat, swelling, and pain." The definition, if not satisfactory, is, at all events, venerable, and therefore ought to command a certain respect; but, unfortunately, it is pretty much all that the student is told of what inflammation essentially is. "If these local signs continue, certain constitutional phenomena manifest themselves," which are enumerated; and amongst other things we are told that a "bitter taste is felt," while no mention is made of such facts as loss of appetite and the presence of thirst. The local symptoms are next illustrated by the case of inflammation as it attacks the different structures of the eyeball, and there "having traced the phenomena as they can be observed by the naked eye," our author proceeds to describe the microscopic appearances. This quickly brings him to speak of the manner in which congestion—active and passive—is brought about. In regard to active congestion, we quote the following:—

> "Every tissue has an inherent power of attracting and selecting from the blood those constituents best suited for its own nutrition. * * This power, exerted by all the textures, is a very important one in maintaining the circulation. By it arterial blood is attracted towards the tissues, hence it is termed the *vis a fronte*, in contradistinction to the power exerted by the heart and elastic coats of the arteries, which is called *vis a tergo*. To the attractive force of the various tissues is due the local determination of blood which occurs in inflammation. When we irritate the web of a frog's foot by some stimulus, such as a drop of acetic acid or a little mustard, inflammation is induced, and we can observe, under the microscope, the changes which take place. The vessels at first contract, and the current of blood through them is more rapid. They then gradually dilate, but the current, though slackened in speed, still passes through them more rapidly than in the normal state, because the *vis a fronte* is increased by the irritation; the blood, therefore, now flows in larger quantity, and with increased rapidity, constituting what is known as *determination of blood to the part*. This is the stage of *Active Congestion*."

It is not often that a doctrine in itself so doubtful and admitting of so little proof as the existence of a *vis a fronte* (increased in some inexplicable way in an inflamed part) is thus made to bear the whole burden in accounting for the occurrence of so familiar a phenomenon as active congestion. To explain the determination of blood to a part by saying that there is an increased attraction of blood by that part, is very much like saying that an extra supply of blood is *sent* there because it is *brought* there, and yet we no more explain the cause or rationale of its being brought than we do that of its being sent. If only one of the theories extant in regard to active congestion must be given, it is a pity, we think, that the lot should fall upon the one in question. Not more satisfactory is Mr Spence's explanation of the stagnation of blood in inflamed parts. He writes:

> "Sir Charles Bell long ago pointed out that whatever either irritated or impaired the vitality of the vascular wall, tended to arrest the flow of the blood, even in the larger vessels. Hence, in the irritated condition of the extravascular tissue, we find a ready explanation of the phenomenon of stasis."

Our author here first assumes that there is an irritated condition of the extravascular tissue (and what a vaguely-expressed assumption it is!) where there is stasis of the blood, and, telling us that Sir C. Bell long ago observed the same thing conversely, namely, that where there was irritation there was this stasis, he offers us the observation of the fact as its explanation. It is only a re-statement of the fact, that where a part is irritated and inflamed to a sufficient extent there is an arrest to the flow of blood, not an elucidation of the causes which bring this about.

It is worthy of remark, that for anything written in this first chapter on the more theoretical points connected with inflammation, we might never guess that the body of man was any more under the control of a nervous system than that of one of the protozoa, were it not that we are told in one place that "Macartney supposed that irritation of the organic nerves of a part constituted the first cause of active congestion," and in another place that "the nervous system is involved" in inflammatory fever.

The whole doctrine of inflammation, then, as we have it here, is that the circulation being carried on by the pumping of a contractile heart and elastic arteries on the one hand, and an attractive force of the tissues on the other, a preponderance of the latter takes place where there is irritation, and we have active congestion, passing on by and bye to stagnation of blood with exudation of fluid, these bringing about a state of redness, swelling, heat, and pain; and when all these four are present, the part is said to be inflamed.

The treatment recommended in inflammation is pretty much according to the established and common creed of surgeons in regard to this matter. Mr Spence seems to be an advocate of moderate depletion under certain circumstances, though his explanation of the mode of action of this remedy is far from satisfactory. He sometimes speaks, indeed, as if there were no circulation at all, and as if arteries were merely communicating tubes containing stable fluid. Thus he says:—

> "If blood be taken from the anterior branch of the temporal artery, we find that the vessels of the conjunctiva are emptied, and the part begins, under the bleeding, to assume its normal appearance."

Now, this appearance will occur without so much blood being abstracted as to weaken the heart's action, and therefore it cannot be from the emptiness of the vessels, seeing that they would be refilled so long as there was no failure of the heart. It is, to our thinking, well established that the change is due to their contraction. Wherever blood is escaping, the vessels in the neighbourhood contract, and even vessels at a distance, and not anatomically connected with them, do the same. John Hunter understood this, and we think it was he who pointed out the special instance which, perhaps, best shows the error of holding that we relieve inflammation by mechanically emptying the vessels of the part—viz., the instance of leeching the scrotum in cases of inflamed testicle. No leech sucking at the skin of the scrotum can remove a drop of blood from the testicle, for the latter is supplied with blood by the spermatic artery directly from the aorta, while the skin of the scrotum gets its blood through branches of the internal iliac, there being no direct vascular communication at all between the two parts. The fact is that the flow of blood from the scrotum causes contraction of its vessels, and thus induces, by what John Hunter called "similar sympathy,"* a contraction of those of the testicle.

Lecture IV. carries us on to the subject of Suppuration and Abscess. Mr Spence speaks of the evil of opening large abscesses freely, but appears confused as to the precise cause of this danger. Thus, after describing the manner in which Abernethy made valved openings "so that no air could enter," he says:—

> "In my own practice I sometimes use the exhausting syringe, which prevents the entrance of air; but, at the same time, I believe that the irritative fever which results is due to the decomposition of the contents of the abscess."

He speaks in another place of the "entrance of atmospheric air, which hastens putrefaction." He neither allows nor denies that the entrance of air causes the putrefaction; but, nevertheless, takes measures to prevent its entrance. He mentions several modes of opening abscesses and condemns one, namely, the opening on the antiseptic principle. He, however, describes it most incorrectly. He says, "You take one part of acid to three parts of oil;" one part to four is the strongest and most irritating solution Mr Lister ever used. Next we are told that you allow "the contents of the abscess to escape through or underneath the lint;" to allow them to escape *through* the lint would be to defeat the object of the lint being used. Lastly, it is taught that "you cover up the portion of lint which overlies the opening" with carbolic acid putty spread on tin-foil; the lint was never left under the putty, but the latter was substituted for it. Its use is merely temporary, and its being left behind would go far to insure failure. It is surely unfair to condemn a treatment when imperfectly acquainted with its details. Mr Spence tells us that he has treated nine cases of abscess in the way he describes, and that they have all failed. The strongest advocate of the treatment could want no better argument to prove that the mere use of carbolic acid, without strict attention to details, will not give the good results that are attainable.

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* We now understand this result to be brought about by "reflex action."

Pyæmia is dismissed most cursorily, and the pathological appearances it presents are described thus, not a word more or less:—

> "After death, abscesses are usually found in the liver and lungs, sometimes in the larger joints."

In fistula in ano it is recommended to divide the rectal wall of the fistula, any collateral sinuses that exist, and the sphincter ani. This is surely formidable treatment.

The lectures on Gangrene are distinguished by what appears to us the best illustration in the book, while, on the other hand, the "characteristic appearances of Erysipelas" pourtrayed in the lecture immediately following are strangely unlike those of the disease as we see it in the sick room. We are reminded by the first of the two illustrations in this last, in the most ludicrous way, of pictures of Red Indian squaws which adorned certain entertaining books of our boyhood, rather than of any case of erysipelas of the face which we remember to have seen. The leg is not more happy as an illustration. The redness has not an erysipelatous tint, and fades gradually into the colour of the surrounding skin, not having the sharply-defined line which is so characteristic of it. As regards swelling, if we except the dorsum of the foot, the limb seems pretty natural.

The most important of the other subjects treated in Part I. are Tumours, Syphilis, Wounds, Burns, and Scalds.

We have left ourselves little space to speak of Part II., and must be content with the briefest possible notice of it. It begins with a disquisition on the diseases and injuries of bone. We quote, as an example of Mr Spence's pathological teaching, an explanation given of the manner in which necrosis is brought about by acute inflammation of bone:—

> "In the chronic form of inflammation time is generally afforded for the dense texture to open out, and for the vascular canals to dilate in proportion to the distension of the vessels, but in acute ostitis the action is too rapid for this; the exudation poured out blocks up the Haversian structure and canaliculi, circulation and nutrition are arrested, and complete death of the part ensues. The denser structure of the bone does not allow of the vessels relieving themselves as in softer parts, and the texture dies from the pressure of the exudation."

This, we fear, is an explanation more curious than correct. Acute inflammation will occasion death of any sort of tissue, if it be sufficiently severe; and the cause of death ensuing more frequently in dense osseous tissue than in any other (not excepting cancellated osseous tissue), is that it is not so richly supplied with blood, and has at the best, therefore, a lower vitality. It is not the peculiar character of the supply of blood which determines the tendency of dense bone to die from inflammation, but the fact that this supply is really less plentiful than in other tissues. The same circumstance makes the cornea apt to slough, while the sclerotic is not so, though both are fibrous structures.

Perhaps there is no distinction which most teachers are more anxious that a student of the diseases of bone should understand than that between necrosis and caries, and especially is this thought desirable in view of the different prognosis and treatment of the two affections. But Mr Spence insists rather on their identity, believing that the differences are merely the result of the anatomical peculiarities of cancellated and dense bone, which caries and necrosis in general respectively attack.

> "I believe that the peculiar obstinacy of a truly carious surface arises from the fact that a large part of it is dead, and consequently requires to be removed by artificial or natural processes ere a cure can be effected. The older surgeons used to speak of moist and dry caries; the latter term denoting the more evident death of bone in sequestra or exfoliations—necrosis. For my own part, I would have little hesitation in defining the actually carious surface as molecular necrosis."
>
> "In the looser cancellated bones, the dead portions are generally granular instead of separating readily in masses; in fact, the form of death is determined or modified by the character of the texture in which this diseased action is situated."

If to this it be objected that the diseases progress in very different ways, and that while the one is very amenable to treatment, the other is not so, Mr Spence answers,

> "I apprehend that all that is meant is just this, that the actually carious portion is incurable, and of this there can be little question; the part so diseased must either be thrown off by nature or artificially removed, but wherein lies the difference between it and necrosis in this respect? The part actually necrosed is also incurable, and it, too, must either be thrown off or removed before a healing process begins; at the very most the difference is, that the carious surface possesses some slight degree of vitality, which renders the process of exfoliation or disintegration by molecular necrosis slower, and is rather a modification of diseased action from the structure of the cancellated bone in which it occurs, than a different disease."

It seems to us, however, that this leaves unexplained the fact of the tendency to recurrence of caries even after removal, a circumstance which does not hold good in the same sense with necrosis. Nor will removal get rid of the disease unless a margin of sound bone be also taken away with it; nay, more, unless all the cartilaginous surface in any joint affected, in however slight a degree, with caries be removed along with the disease, we can have no security that it will not recur in the cartilage left behind, for it most frequently begins as an ulceration or erosion of the cartilage, and only extends afterwards to the bone itself. This fact in regard to its mode of origin is also difficult to reconcile with the idea that it differs in no other way from necrosis than the difference of cancellated and dense bone will account for. Further, it is a matter of observation that necrosis proper does, every now and then, manifest itself in cancellated bone quite apart from caries, showing that there is nothing in the anatomical peculiarities of that structure incompatible with its occurrence. Thus, sequestra are found in the substance of the os calcis, and even in the cancellated ends of the long bones, unassociated with any caries, and when removed leave behind a perfectly smooth cavity lined with granulations which contracts and heals without further trouble. Professor Syme, in an early work,* describes a case in which necrosis of the whole head of the humerus occurred in consequence of a fall on the shoulder, and gives it as his opinion that it was in such another case, and not one of caries, that Mr White, of Manchester, gained the credit of having first excised the shoulder-joint.

Lectures on affections of tendons and blood-vessels conclude the volume; the latter subject being exhaustively treated and illustrated with very interesting clinical cases. Indeed, we have no hesitation in fixing upon these last lectures as the best of the two volumes. We regret that having occupied so much space in pointing out defects, we cannot make more of our disposition to commend this part of the work.

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* *Contributions to the Pathology and Practice of Surgery.*

We have thus shortly and, in the old law-phrase, *without feud or favour*, noticed some of the points treated of by Mr Spence. We conclude as we began, by saying that we cannot recommend the book to him who is in quest of surgical lore of such a kind as ought to be taught at this time of day. The pathological opinions inculcated, as far as we understand them, are old and erroneous, and even much of the practical instruction is behind present advancement; while the illustrations are gaudy and striking rather than truthful—curious rather than instructive. In short, we regret exceedingly that Mr Spence should dim the reputation he possesses of being a good surgeon, by the publication of a work so very much below the average of the numerous and excellent text books on surgery we already possess.

II.—THE PRESENCE OF ORGANIC MATTER IN POTABLE WATER ALWAYS DELETERIOUS TO HEALTH; *to which is added the Modern Analysis. By* O'BRIEN MAHONY, L.R.C.P., Ed., L.F.P.S., L.A.H., &c., &c. Second Edition. pp. 112. Dublin: Fannin & Company. 1869.

THE speedy reappearance of this essay in a second edition is sufficient evidence that it has been appreciated in some quarters. It is continuous, without any indications of chapters or sections, but seems to be divisible into three portions,—the first, which is the longest and most important, being on the analysis of water, with especial reference to hardness and organic pollution; the second on the spontaneous generation question; and the third on the need for extended sanitary legislation, especially on the subject of water supply.

The analytic part will be of much service to the practical operator about to examine drinking-water, as the processes recommended are among the easiest available, and are minutely detailed. Some very unusual methods, however, are introduced. Thus, no one procures carbonic acid by warming water charged with it (p. 21), or, to the best of our information, has ever estimated chlorine in drinking-water by heating it in a combustion-tube with chromate of lead and quicklime (p. 35). This is applicable only to chlorinated organic bodies, such as chloroform or Dutch liquid. The use of the symbols—"$S.O._3$" and "$N.O._5$"—for sulphuric and nitric acid is quite out of date. Several improvements might have been introduced in a second edition. Even the briefest description of the necessary apparatus, and means of ensuring the purity of the reagents, would have been useful, as well as more conciseness and less repetition. There are one or two slight inaccuracies, besides typographical errors, which are not a few, and are repeated even in the emended "Errata."

III.—THE LIVERPOOL MEDICAL AND SURGICAL REPORTS. October, 1869. *Edited by* P. M. BRAIDWOOD, M.D., *and* REGINALD HARRISON, F.R.C.S., *Assistant Surgeon to the Royal Infirmary.* pp. 140. Liverpool: Adam Holden. 1869.

THIS, the third annual volume of the Liverpool Medical and Surgical Reports, is scarcely equal to its predecessors. This, however, arises rather from the superior merit of previous volumes, than from the absolute inferiority of the present.

The first paper, "On Chorea, General and Local," by Dr Inman, is written in the jaunty, journalistic style which that gentleman affects, which always ensures a "readable" article, but sometimes fails to impart anything new or positive in the way of information. The second and fourth papers, by Drs Braidwood and Wollaston, on Tracheotomy, both agree in urging the importance of performing the operation early, whether in acute diseases, such as croup and diphtheria, or in more chronic affections of the larynx. We have no hesitation in saying that there is a fatal tendency to delay in the practice of British surgeons, as if Tracheotomy were an operation which—if performed with the most ordinary skill—could, in the circumstances which require it, either of itself prove fatal, or add to the risk of a fatal issue. We quite agree with Dr Braidwood that Tracheotomy should be made more a part of treatment than a *dernier ressort*. Mr Hamilton's paper on "Carbolic Acid in Surgery" is, on the whole, in favour of Mr Lister's method. Mr Banks' paper "On Some Peculiar Results of Injury to Digital Nerves" is very interesting and valuable. We observe a curious slip in the narrative of Mr Banks' second case, in which the word "*ring*-finger" is employed at the outset to indicate the affected digit, and afterwards "*fore*-finger," which last seems to be right, as we read of "a small splint put along the back of the hand and *two first* fingers." Mr Bickersteth's "Clinical Observations on Submaxillary Cellulitis" illustrate the necessity of early and free incision in such cases.

There are typographical errors in the volume which ought to have attracted editorial notice—*e.g.*, "Decoct. Sarsæ. Co.," and "Phagadænic."

Clinical Record.

I.—CASES OF EXTRACTION OF CATARACT AT THE GLASGOW EYE INFIRMARY, 1869.

Reported by Dr Charteris.

Case 1.—M. F., aged 65, admitted on the 24th of February, with fully formed cataract in both eyes. *March 3rd*, Dr Reid extracted the left lens by superior section (ordinary flap operation). 6th, Complains of pain in eyes; bandages appear to have been disturbed. 7th, On removing the bandages a quantity of puro-lymph was seen to occupy the wound. Ophthalmitis subsequently set in, followed by atrophy. The patient afterwards confessed that on the second day after the operation this eye had been accidentally struck by coming suddenly into contact with the head of another patient.

Case 2.—M. L., aged 51. Right lens had been extracted by superior section on 11th September, 1868. *March* 26, 1869, Left lens extracted by superior section. Both operations were performed by Dr Rainy. July 2d, was able to read No. 2 J. with either eye.

Case 3.—Alex. S., aged 28, admitted April 6, 1868. Patient has suffered from irido-choroiditis from childhood. Extensive adhesion of iris to capsule in both eyes; barely distinguishes light and shade. The patient having been put under the influence of chloroform, Dr Rainy made a linear section with Von Græfe's knife through upper aspect of left cornea, and scooped out the lens. *April* 7, Bandages removed; wound united; pupil a little irregular. 20th, Sees the fingers and large objects by reflected light.

Case 4.—James K., aged 66, admitted April 20, 1869. Fully formed cataract in left eye, and less advanced in right. 21st, Dr Rainy extracted left lens by superior section. *July* 24, Reads No. 16 J.

Case 5.—James M'K., aged 53, admitted Feb. 20, 1860. Incipient cataract in both eyes. *August* 30, 1864, Left eye has been operated on unsuccessfully elsewhere; cataract advancing in right. *May* 19, 1869, Dr Rainy removed right lens by superior section. *Dec.* 15, Granular lids on both sides; right cornea hazy; sees letters in No. 16 J.

CASE 6.—Marion P., aged 60, admitted May 14, 1869. Cataract of three years' duration in both eyes; most advanced in left. 19th, Dr. Rainy extracted left lens by superior section. *June* 4, Makes out letters in No. 8 J.

CASE 7.—Rosan C., aged 54, admitted 19th April, 1869. Fully formed cataract of seven years in left eye, cortical opacities in right. 21st, Dr Rainy extracted left lens by superior section. *May* 6th, Capsular opacity in pupil. *June* 6th, Opacity in pupil divided. Reads No. 8 J.

CASE 8.—Mary R., aged 64, admitted June 16, 1869. Fully formed cataract in both eyes. Dr. Reid extracted right lens by superior section. *July* 1, small prolapsus of iris snipped. *Oct.* 1, Makes out No. 8 J.

CASE 9.—James M'F., aged 60, admitted March 31, 1868. Right ball soft and slightly atrophied; incipient cataract in left. *June* 24, 1869, Dr Reid extracted left lens by superior section. 28th, Wound cicatrized; an opacity in pupil. *Sept.* 24, a small opening made in cornea, and the opaque matter extracted. 27th, Reads No. 6 J.

CASE 10.—Agnes L., aged 56, admitted Dec. 10, 1866. Hard cataract in both eyes. *Dec.* 30, Dr Rainy extracted left lens by superior section. *July* 2, 1867, Opaque capsule occupying pupil divided. *Oct.* 23, Reads No. 1 J. *June* 26, 1869, Dr Reid extracted right lens by superior section. *July* 12, Reads No. 6 J. with this eye.

CASE 11.—Ann M'L., admitted June 9, 1869. Dr Rainy extracted left lens successfully about twelve months ago. *June* 23, Dr Reid extracted right lens. The patient, a Highlander, and totally ignorant of English, attempted to get up during the operation, and had to be held forcibly on the table. The section was rather small. Having enlarged it, and at the same time made a small iridectomy, the lens was extracted. The wound united favourably, and on *July* 28 she could read No. 6 J.

CASE 12.—Robert P., aged 52, admitted Jan. 24, 1868. Incipient cataract in both eyes; more advanced in left. *May* 16, Left mature. 20th, Extracted. *July* 7, 1869, Right lens extracted by superior section. 9th, Wound united. 24th, Reads No. 2 J. with either eye. Both operations were performed by Dr. Reid.

CASE 13.—Arch. B., 64, admitted May 24, 1869. Cataract in both eyes. *July* 21, Dr Reid extracted right lens by superior section. Vitreous fluid. *Sept.* 10, reads No. 2 J.

CASE 14.—Janet N., aged 66, admitted July 22, 1869. Fully formed cataract in both eyes. 23rd, Dr Reid extracted left lens by superior section. *Sept.* 1, opaque matter in pupil divided. 10th, reads No. 2 J.

CASE 14.—Janet N., aged 66, admitted July 22, 1869. Fully formed cataract in both eyes. 23rd, Dr Reid extracted left lens by superior section. *Sept.* 1, an opacity in pupil divided. 22nd, reads No. 6 J.

CASE 15.—Margaret M'K., aged 70, admitted July 24, 1869. Fully formed cataract in right, less advanced in left. 28th, Dr Reid extracted right lens by superior section. Vitreous fluid. *Aug.* 6, wound cicatrized. *Oct.* 30, reads No. 10 J.

CASE 16.—Jane R., aged 54, admitted July 31, 1869. Fully formed cataract in right eye, less advanced in left. *Aug.* 4, Dr Reid extracted right lens by superior section. 10th, small prolapsus of iris. 25th, prolapsus punctured. *Sept.* 15, wound completely cicatrized; reads No. 12 J.

CASE 17.—Janet K., aged 66, admitted April 3, 1866. Fully formed cataract in right eye, less advanced in left. *July* 5, Dr Reid extracted right lens by superior section. *Oct.* 24, makes out No. 6 J. *Aug.* 11, 1869, Dr Reid extracted left lens by superior section. *Sept.* 15, reads No. 8 J.

CASE 18.—Gregor M'G., aged 23, admitted Aug. 31, 1869. Appears to have suffered from irido-choroiditis in left eye since childhood. Anterior capsule of lens opaque. Iris adhering to capsule. Left pupil dilated and fixed. Cortical opacity in posterior surface of lens. Is barely able to distinguish light and shade with either eye. In the hope that there might be still a quantitative perception of light in left if the opacity were removed, Dr Reid performed iridectomy on *Sept.* 1, and on the 22nd, through a small superior section, scooped out the opaque lens through the posterior capsule. The dense opaque anterior capsule was then detached from its adhesions to the iris and extracted. The wound cicatrized favourably. Patient could distinguish light and shade. With the ophthalmoscope there was seen very extensive exudation beneath the choroid. An iridectomy was performed on right.

CASE 19.—Martha G., admitted Oct. 8, 1866. Fully formed cataract in right eye. General health weak. *Sept.* 1, 1869, Dr Reid extracted right lens by superior section. Vitreous very fluid, and the lens had to be removed with the curette. Wound cicatrized favourably. 15th, reads No. 8 J.

CASE 20.—William M., admitted January 7, 1864. Cataract in both eyes, more advanced in left. *Oct.* 3, Dr Rainy extracted left lens by superior section. *March* 7, 1865, vision, which was good, has been dimmer since January. Reads No. 14 J. Sumat pot. iodidi gr. ter die. *May* 12, reads No. 12 J. *Sept.* 5, 1869, a pterygium forming in right. 24th, Dr Reid extracted right lens by superior section. *Oct.* 8, reads No. 2 with right and No. 1 with left eye.

CASE 21.—James W., aged 25, admitted Sept. 29, 1869. Coloboma iridis of about one-third of lower segment in both eyes. Irides tremulous. Right lens opaque. After consultation, it was decided to remove the lens—which was soft—through a small linear section. This was followed by considerable escape of fluid vitreous. The greater part of the lenticular substance was scooped out. The anterior capsule adhered firmly to the iris, and the danger of collapse of the eye being imminent, it was judged safer to bind up the eye, and break up the capsule afterwards. *Oct.* 3, wound united.

Ball very soft. Sumat quinæ sulph. c. acid. sulph. arom. 25th, tension of ball nearly normal. Opaque capsule shrinking. A small band of iris stretching across centre of pupil. Reads No. 16. [Patient requested to return for division of band.]

Case 22.—Ann F., aged 66, admitted October 5, 1869. Fully formed cataract in right. Left eye was operated on unsuccessfully elsewhere last year. 7th, Dr Reid extracted right lens by superior section. 29th, Reads No. 8 J.

Case 23.—Margaret L., aged 60, admitted Oct. 22, 1869. Fully formed cataract in right eye; less advanced in left. Health indifferent, and evidently of intemperate habits. 29th, Right lens extracted by superior section, with a small conjunctival flap. *Nov.* 3, Wound united; integuments of both lids sloughy and suppurating; sees large objects. 15th, The purulent discharge from lids appears to have infiltrated the cicatrix; a small prolapsus of iris on either side of conjunctival flap. *Dec.* 3, Prolapsus reduced; wound firmly cicatrized; a small crescentic ulcer on centre of cornea; health feeble; ordered porter, from the want of which she appears to have suffered. *Jan.* 19, 1870, Health still very bad; reads No. 16 J. easily.

Case 24.—Christina M'C., admitted July 13, 1868. Cataract well advanced in right eye; beginning in left. *Nov.* 12, 1869, Right lens extracted by superior section. 14th, Had a severe attack of bilious vomiting and diarrhœa. 18th, Bandages removed; wound united; a good central pupil; sees large objects; the disordered condition of stomach and bowels continues; great irregularity of heart's action. *Dec.* 2, Had an attack of rheumatic ophthalmia, immediately followed by a convulsive seizure, which lasted for 6 hours. *Jan.* 10, Health, which appears to have continued very bad up to this date, is much better; pupil contracted and partially occluded with lymph. *Jan.* 19, 1870, Opaque matter in pupil removed; sees letters in No. 14 J. 22nd, Vision improving; sees No. 12 J.

[*Remarks.*—In these reports of cases of extraction of cataract at the Glasgow Eye Infirmary during the past year, all cases of traumatic or other cataract, requiring modified and generally trifling operations, have been excluded. Six of these cases were operated on successfully by my colleague, the late Dr George Rainy. Of the remaining cases, two had an iridectomy performed—one preliminary, and the other at the operation. The other cases were operated on by the old flap operation. In three there was slight prolapsus of the iris, which prolonged the treatment, but did not otherwise affect the result. Three required a secondary operation. The results may be summed up thus:—

Lost from ophthalmitis, ...	1
Vision not improved, ...	1
Vision improved, ...	1
Both eyes operated on successfully, ...	6
One eye operated on; vision good, ...	15

It will thus be seen that out of 24 cases of extraction, 23 were successful, as far as the operation was concerned. That the vision in some cases was not much improved, is due to the fact that the rule at the Glasgow Eye Infirmary is that all cases are operated on, where the approaching blindness and a prospect of improving matters render it advisable to interfere, viz., adherent iris, irido-choroiditis, fluid vitreous, tremulous iris, &c., complications which generally impair the vision. No single method of operating was exclusively followed, but each case was treated in the way most likely to insure a successful result. The majority of the cases were operated on by the old flap, which, on the whole, after a considerable number of comparative trials with other methods, was found to be suitable for most cases, and produced equally good results. I prefer a small Beer's knife, and make a section of about a third of the margin of the cornea. I never use chloroform, and only in exceptional cases have recourse to forceps to fix the eyeball, in order to avoid all possible sources of irritation. When carefully performed, there ought to be no accident, such as escape of the lens or vitreous, or prolapsus of the iris, in completing the section. A contracted or undilatable pupil presents no serious obstacle, and by pressing gently on the lower margin of the cornea as the upper margin of the lens is emerging, the upper segment of the iris falls into its place, and, by the elasticity of its circular fibres, aids in the final expulsion of the lens. A small prolapsus of the iris, in three of the cases, before the wound was quite united, was the only complication, and did not affect the final result. When there is reason to fear this complication, an iridectomy may be performed at the operation, before extraction, as in Case 11. The wound generally united in from two to six days, varying with the condition of the patient.—T. R.]

II.—CASES OF PODALIC VERSION BY THE COMBINED METHOD.

Under the care of and reported by J. S. Aikman, *Blackburn.*

Case I.—*Transverse presentation, with contracted pelvis; version; rapid recovery of both mother and child.* Mrs M., Great Harwood,—a strong country woman of 39 years of age. Since the age of eight years, she has been constantly engaged in weaving. For the first six years at the hand loom, and since then the steam one. Her mother's family was numerous, and she, being the eldest, was from a very early age made a sort of general nurse, and so constantly subjected to carrying weights greater than her strength was adapted to.

Since her marriage she has borne eight children, only two of which are living—the youngest surviving one being seven years of age and the third last born. The others were all born still. In seven cases she has been delivered by long forceps and with considerable difficulty; in the other by craniotomy. On the 18th of November, 1869, I was called to attend her in her ninth confinement. I found her suffering from pretty severe pains. having all the character of those of the first stage. On examination the os was found nearly fully dilated, the membranes unruptured, and the left shoulder presenting. The pelvis was very much contracted, principally in the antero-posterior diameter—the sacrum being very prominent and its ridge very sharp. The heart sounds centred on the right side not far above the pubis, and were almost entirely confined to below the level of umbilicus. Under these circumstances I determined to turn at once. Having inserted two fingers into the vagina in such a manner as to be able freely to act upon the presenting part, I commenced to search the left side of the abdomen for a part, at which pressure with the other hand would alter the position of the presenting shoulder. This I soon found, and by gentle manipulation with the hand on the abdomen and aiding the retreat of the shoulder by the fingers at the os, I soon got hold of a foot. This was then pulled well down into the vagina so as to complete the version, and then I waited for natural pains. These were soon set up, and after a time the body of the child was born as far as the shoulders, but certain convulsive twitchings induced me then to hurry the delivery, and with considerable difficulty I extracted the head. The child was born still, but was resuscitated. The uterus contracted well and expelled the placenta in less than half-an-hour. The mother recovered without a bad symptom.

CASE II.—*Transverse presentation with prolapse of the funis; version; safe delivery.* Mrs S., Castle Street, Blackburn—a moderately healthy woman of about 35 years of age. Has previously borne eight children, and always had easy labours. Has been subject to extreme sickness, and of a peculiar shape during the whole of this pregnancy which led her to send for aid as soon as labour commenced. On arriving, I found the os but little dilated, the membranes entire, and a joint, either an elbow or knee, presenting, but not wishing to risk rupture of the membranes, I did not push the examination. The auscultatory signs pointed plainly to transverse presentation. On returning, about 5 hours later, I found the os nearly fully dilated, and the left arm and hand lying in the bag of membranes along with a coil of the funis which was distinctly pulsating. I immediately determined to turn, which I easily did by a method similar to that detailed in the preceding case. The foot was merely brought into the vagina, and nature did all the rest, requiring only a little assistance at the delivery of the head. The child was born strong, and cried lustily. The mother made an excellent recovery.

Remarks.—Both of these patients declared these to be the easiest of all their labours. These two cases have so favourably impressed me with the ease and safety of this method of version, that I should be inclined to try it in every case of transverse presentation where it seemed at all practicable. It is comparatively a painless operation, and is certainly much more delicate and better suited for private practice than the old one. My only regret is, that I have not yet had an opportunity of trying it where the membranes had been ruptured, in which case it must be attended by greater, but not insurmountable difficulties.

III.—CASE OF INTERMITTENT FEVER TREATED BY SUBCUTANEOUS INJECTION OF SULPHATE OF QUININE.

Under the care of DR M'CALL ANDERSON.

Reported by WILLIAM MACEWEN, M.B., C.M.

J. H., aged 25, sailor, was admitted into the Glasgow Royal Infirmary, January 29, 1870. He was attacked by ague about four months previous to admission, while he was living in the midst of rice fields in the Southern States of America.

During this attack he had a paroxysm every second day, and was able to calculate to an hour the period of recurrence of the fit, as each attack commenced 47 hours after the preceding one.

At this time quinine was administered in large doses, and the first effect of it was to cause an irregularity in the periodicity of the attacks, and a lengthening of the remissions. As soon as the fits ceased he went to sea, following his usual avocation as a sailor, and on the tenth day following the last fit, he had a recurrence of the ague. A week after the commencement of this attack he was admitted into the New York Hospital where he remained three weeks, during which time he was again treated successfully with quinine. On this occasion the paroxysms recurred every third day, otherwise they were the same as before. He then took a voyage from New York to Antwerp, and after being at sea 20 days, he had another attack which lasted about 29 days, 15 of which were spent on board ship, where he administered to himself a mixture of gunpowder and treacle, which is said to be used by the negroes of the Southern States as a substitute for quinine. Latterly he was admitted into the hospital at Antwerp, and during his residence there, the paroxysms recurred every second day. After leaving Antwerp he had two paroxysms, the one 14 and the other 18 days after leaving that city, being the day before he was admitted into the Infirmary.

The ague fit generally lasted about four hours; he was first seized with a feeling of intense cold, followed by a well marked rigor which pervaded the whole body, and lasted about an hour and a half; about a quarter of an hour after this abated, the fever commenced, and was accompanied by great thirst, and occasionally by a dull, aching pain across the temples. This lasted for about two hours, and was relieved by profuse perspiration which covered his whole body, after which he fell into a deep sleep, and awoke refreshed.

Physical Examination.—On examining the abdomen, the liver and spleen seemed normal. Lungs and heart also normal, with the exception of slight wheezing rales at bases of lungs posteriorly. Bowels regular. Tongue clean. Skin cool and moist. Pulse 90, strong.

On February 1st, he had another paroxysm. The chill and subsequent fever were slight, each lasting from three quarters of an hour to an hour; the sweating was profuse, and lasted four or five hours. From this time to the 12th of February he was free from an attack, but on that date he had a slight trembling and feeling of coldness which commenced at 9·30 A.M. and lasted till 2 P.M., and was followed by profuse perspiration without intervening fever. On that day 2½ grains of sulphate of quinine dissolved in 30 minims of water by the aid of 2⅝ minims of diluted sulphuric acid were injected into the subcutaneous cellular tissue of the trunk.

On the 13th he had an attack of sweating, lasting from 3 to 7 P.M., without preceding rigor or fever, but ushered in by the uncomfortable feelings which he always experienced before a typical paroxysm.

From this time he had a daily injection of 2½ grains of sulphate of quinine.

He got in all 14 injections, and had no more attacks up to the time of his dismissal from the hospital on March 5th, 1870, *i.e.*, nine days after the treatment was stopped. A fortnight after this he reported himself to be in perfect health.

IV.—CASE OF PUERPERAL CONVULSIONS ILLUSTRATING GREAT BENEFIT DERIVED FROM VESICATION.

Under the care of and reported by Dr R. BELL.

ON Saturday, February 12, at 5 a.m., I was called in to attend Mrs F. who was in labour. Patient was a tall and large boned woman, but the natural appearance was entirely masked by an enormous amount of anasarca and ascites. The urine was loaded with albumen. Before my arrival she had had two convulsions, and within a few minutes she took another which lasted about five minutes. Until 9·30 a m. the fits returned every half hour, and up to this time no progress was made in labour on account of rigidity of the os uteri, it not being dilated to more than the size of a shilling.

At 5 o'clock Dr J. G. Wilson saw the patient in consultation, when sinapisms to the calves were ordered, which acted as well as could be desired; the hair was also cut short, and whisky and water cloths applied to the head, great attention being at the same time paid to keeping the extremities warm. To cause free action of the bowels, 16 grs. of calomel in a little olive oil were administered, followed in two hours by a castor oil and turpentine enema. These means had the desired effect of clearing out the bowels.

At 9·30 P.M. Dr Wilson again saw the patient with me, when ¼ grains of Tartrate of Antimony was given which immediately had the effect of dispelling the cartilaginous state of the os, and within 20 minutes the head filled the true pelvis. No sooner had the head of the child advanced thus far, than the pains came on at shorter intervals, as also did the convulsions, so that a fit occurred every 10 minutes and soon no interval could be distinguished. I immediately applied the forceps and effected delivery, as the pains were quite useless in expelling the child. No sooner had delivery been accomplished than the seizures became less frequent, so that she had only 4 within the next hour, and afterwards at longer and longer intervals, only 4 more occurring by next morning, and they afterwards ceased entirely. Within a few minutes after delivery Dr Wilson again saw the patient, when it was thought advisable to renew the application of sinapisms to the calves; the head was shaved and a bladder of ice kept constantly applied to the scalp; 20 gr. doses of bromide of potassium were given every 2 hours; and beef tea and brandy injections every 2 hours. During the whole time of labour from 6 a.m. the patient was comatose with pupils quite insensible to light. It may here be mentioned that Dr Wilson and I considered it not a suitable case for the administration of chloroform; and on account of the enormous amount of œdema we did not think it possible to extract blood, if that had been thought expedient.

At 6 p.m.—There was deep coma, with stertorous breathing.

At 12 p.m.—In much the same state. Passed catheter, but found no urine in bladder; the urine passing involuntarily.

Feb. 13.—Dr Wilson and I saw patient together at 9·30 a.m. She was still in the same state of deep coma, with stertor. Urine still coming away involuntarily. A large blister has appeared on each calf on the site of the sinapisms, from which was taken fully a pint of fluid.

At 12 noon.—Coma and stertor still persist; pulse, 150. Blisters discharging freely; urine copious. Dr Rainy was called in consultation and looked upon the case very unfavourably. He suggested no other mode of treatment, and concurred in all that had been done.

At 2 p.m.—Brandy was ordered to be given with a feather, and soon patient could swallow a little given with a spoon.

At 4 p.m.—Blisters discharging freely; urine plentiful; bowels loose, the evacuations having a urinous smell. Pupils are slightly affected by light, and there is not so much stertor.

10 p.m.—Pulse 120. Pupils still more sensitive to light. Blisters still discharging freely; urine passing involuntarily in large quantities, but it is not so albuminous. Altogether, patient seems very favourable. Beef tea ordered by mouth, and the brandy to be continued.

Feb. 14.—Patient's condition is very much improved; the pupils very much more sensitive, and she can be roused to answer questions. Blisters still discharging freely, and urine very copious and contains just a trace of albumen.

From this time patient continued to improve and is now quite well. The blisters continued to discharge till the 16th February.

The only reason why this case is brought before the profession is, that Dr Wilson and I attached so much importance to the free discharge of serum from the blisters on the calves, as a therapeutic agent, and to this accidental occurrence ascribe in a great measure the favourable result. Does not this point to blistering being of very great value in puerperal convulsions? The very favourable termination of this case, which at one time was looked upon so unfavourably, would at least encourage one to try the same plan of treatment in a similar case.

Exchange Journals.*

VIRCHOW'S ARCHIV, VOL. XLIX.

PART I., DEC., 1869.

CONTENTS.—I. From the Institute of Pathological Anatomy of the Athenæum at Amsterdam—Communicated by Professor H. Hertz, M.D. (Continuation from Vol. XLVI., p. 243); (3) A myxoma the size of a hen's egg in the right lateral ventricle; (4) A case of extensive degeneration of both suprarenal capsules without abnormal pigmentation of the skin. II. Multiple Neuromata, by Dr Anton Genersich, Pesth. III. From the Institute of Pathological Anatomy at Zürich, by Prof. C. J. Eberth, M.D.; (1) On the blood and lymphatic vessels of the brain and spinal cord: (2) The development of epithelioma (cholesteatoma) of the pia mater and the lungs (with Plates I. and II.); (3) A case of Adenia (pseudo-leukæmia). IV. Observations on the absorption of extravasated blood, and the formation of pigment in the same, by Dr Th. Langhans, Marburg (with Pl. III., fig. 3-9, and Pl. IV., fig. 1-5). V. A case of melanoma of the cornea, by Dr Th. Langhans (with Pl. III., fig. 1-2, and Pl. IV., fig. 6). VI. On the crisis and delirium in Relapsing fever, by Dr Fräntzel, Berlin. VII. Smaller Communications: (1) A very large hæmorrhagic cyst in the abdomen, by Dr Julius Stein, Bayreuth; (2) A bicephalous fœtus, by Dr M. Fränkel, Dessau.

I. (4) In this case, though the colour of the skin was not changed, yet the other symptoms of Addison's disease were present—namely, emaciation debility, muscular weakness, oppression, pain in gastric region, sickness, vomiting, anæmia, constipation; the cœliac axis was also affected in the way already noticed by several authors; the disease had existed for a year and a half.

IV. and V. In the former of these two papers the author tries to prove from experiments on animals that in the absorption of an ordinary ecchymosis, red blood corpuscles are taken up by contractile cells at the periphery of the clot, and that in these cells the corpuscles disintegrate and leave a granular pigment which gradually disappears; in the second of the papers he describes the appearance of a melanotic tumour of the cornea, in which he ascribes the coloration to red corpuscles taken up by cells and undergoing disintegration in them, as in the case of ecchymosis in animals.

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* Under this title we propose to adopt a practice which is followed by certain French journals, and may be useful to our readers—*i.e.*, to give the contents of Virchow's Archiv, with short notes of a few of the articles. In next number we shall do the same by Reichert and Du Bois Reymond's Archiv. Our readers will thus have an index of all that appears in these journals, informing those who cannot see them regularly of papers which may be of special interest in special enquiries, and putting the gist of the most interesting and important at the disposal of all.—ED. COM.

VI. In the author's cases of Relapsing fever, amounting to 100, the first crisis occurred generally on the 5th, 6th, or 7th day, and the second on the 3rd, 4th, or 5th after shivering; the duration of the crisis was usually only 6 to 8 hours, and during this period the temperature usually fell at least 5° Centigrade (9° F.), and the pulse 60 beats; he found delirium in 27 cases—in 12 only during the fever, in 12 only at crisis or after, and in 3 at both periods; he looks on the delirium after the crisis as a delirium of inanition, in this respect resembling *delirium tremens*, and treats it by hypodermic injection of morphia in small doses ($\frac{1}{8}$ gr. of acetate of morphia).

PART II., JANUARY, 1870.

CONTENTS.—VIII. A large osteoma of the left hemisphere of the cerebellum, by Dr W. Ebstein, Breslau (Plate V., fig. 1-2). IX. On enterotomy in ileus, by Dr Fräntzel, Berlin. X. The pathology and diagnosis of mediastinal tumours, by Dr F. Riegel, Würzburg (Plate V., fig. 3). XI. On a rare malformation of the thorax, by Dr Eggel, Tübingen (Plate VI. and VII., fig. 1). XII. On cellular and intercellular (so-called interstitial) growth of bone, by Dr C. Ruge, Berlin (Plate VIII.) XIII. The action of alcohol on the animal organism, by Dr. P. Ruge, Berlin. XIV. On clonic spasms, by Dr H. Nothnagel, Berlin. XV. Smaller communications: (1) The position of the soft palate in death by hanging, by Prof. Ecker, Freiburg; (2) Contribution to the history of tuberculosis, by Prof. Klebs, Bern; (3) The dissection of an Agouti (Dasyprocta azaræ), by Dr F. Hilgendorf and Dr A. Paulicki, Hamburg; (4) Several myomata in a musk-rat, by the same.

VIII. The case is remarkable in respect that though there was a large osteoid tumour in the cerebellum, yet there were no symptoms during life referable to the central nervous system; the case agrees in this respect with several others reported by different authors; the occurrence of a true bony tumour in the brain is also remarked as a very rare phenomenon.

IX. Two cases of the operation are given, one of which was successful; the author recommends the operation in certain cases.

XII. The author holds, from observations both in animals and man, that bone grows by deposition or intussusception in the intercellular substance, as well as by conversion of cartilage and periosteum; by this intussusception the lacunæ are wider apart in adult bones than in those of the child, and the author thinks he can distinguish the age of a bone by measurement of the distance between the lacunæ.

XIII. This paper gives the results of experiment on 22 dogs and 5 rabbits; the results were principally negative.

XV. 2. The results will be published more fully afterwards, in the meantime his conclusions are: (1) The tubercle virus is soluble in water; (2) Tuberculosis is communicable by feeding animals with human tubercle; (3) The tuberculosis of oxen is identical with fibrous tuberculosis; (4) It owes its origin to the same virus.

PART III., FEBRUARY, 1870.

CONTENTS.—XVI. Observations on the development of multilocular cysts of the ovary, by Prof. A. Boettcher, Dorpat (Plates IX. and X). XVII. From the anatomical department of the University of Tübingen, a case of semilunar valves in the urethra, and an enlarged vesicula prostatica, by N. Tolmatschew. XVIII. Contribution to the pathological anatomy of the central organs, by Dr R. Arndt, Greifswald (Plate XII). XIX. Laryngeal respiration, by Prof. B. Choynowski, Warsaw. XX. The juice of the fruit of Momordica elaterium, in its historical, chemical, and physiological relations, by Dr H. Köhler, Halle. XXI. Smaller communications: (1) A case of ganglious neuroma (Ganglioma), by Dr W. Loretz; (2) A peculiar action of chloroform, by Dr Hegar and Dr Kaltenbach, Breisgau; (3) A case of Retinitis leukæmia, by Dr M. Roth, Greifswald; (4) A case of Lipomatosis musculorum luxurians in the inferior extremities, and progressive muscular atrophy in the superior, by Dr A. Eulenburg, Berlin; (5) On poisoning by Atropine, by Dr B. J. Stokvis, Amsterdam; (6) Contributions to the position of a southern climate as a therapeutic agent, by Dr F. A. Hartsen, Pau; (7) Tables showing the total number of swine killed and examined for trichinæ in Rostock during the year 1869, by A. Petri, Rostock.

XVII. The anatomical peculiarities in this case were the well marked and complete semilunar valves in the urethra, the absence of the vesiculae seminales, the vasa defferentia having blind ends, and the dilatation of the vesicula prostatica; the pathological appearances consisted of dilatation of all the portions of the urinary apparatus above the valves in the urethra, with cysts in the kidneys and atrophy of their proper tissue; the case was that of a boy who died soon after birth, death being apparently caused by retention of urine resulting from the valves in the urethra.

XVIII In this paper hyaloid degeneration of the brain and spinal cord is investigated.

XXI. (2) The observations were made in a lying-in hospital, but some of them on non-puerperal women who were admitted for operations connected with the uterus; in several cases, the urine, evacuated immediately after the administration of chloroform, was found to contain albumen and renal epithelium; the same result was found in an experiment on a dog; in some cases, however, no albumen appeared in the urine after chloroform administration.

XXI. (5) The cases of a man and his child, who took by mistake an infusion of Belladonna, are related; the principal symptom in both cases was delirium.

TRANSACTIONS OF
The Medico-Chirurgical Society.

SESSION 1869-70.

SIXTH MEETING, 4th February, 1870.—Dr Fleming, President, in the chair.

Dr Morton read

THE HISTORY OF A CASE OF FRACTURE OF THE FEMUR, BEARING CHIEFLY ON THE DIAGNOSIS OF SUCH LESIONS.

A drawing and cast of the bone were exhibited. The chief interest of the case lay in the illustration it afforded of the difficulties often attending the diagnosis of fractures of the neck of the femur. In Dr Morton's case there was a remarkable contrariety of opinion as to the lesion among several surgeons who examined the patient; his own opinion, however, having been that the injury was—what death from a subsequent accident enabled him to prove it to be by *post mortem* examination—viz., a case of fracture.

Mr John Reid read a paper on

GRATIS SPECIAL DISPENSARIES.

He objected to the practice of bidding for popularity by a show of gratis advice to the poor. Every member of the profession was ready where need was to advise the poor without reward, and this generosity, with the provisions of the Poor-Law, he thought sufficient to meet every case. There were certain medical charities—viz., the Infirmary, Lying-in Hospital, and Eye Infirmary—which were necessary. These were purely gratuitous, and quite equal to the public need. Such institutions existed for the general good, and medical men were therefore proud of their connection with them; but private "Dispensaries," and particularly advertised ones, were justly regarded with suspicion. The possibility was that the greater proportion of those who went to so-called "Gratis Dispensaries" would have gone to the nearest practitioner, and have paid for their advice. He would therefore advise those gentlemen who were connected with such Dispensaries to abandon them as injurious to their brethren in the profession, especially to its junior members.

Dr Morton had no doubt that these dispensaries were frequently uncalled for, that they sometimes injured the members of the profession, especially those struggling to rise in it, and that an unprofessional thing was done in advertising them. The chief evil was that the advice was not always given gratis; he had heard of cases in which a fee was charged, and this was certainly most unprofessional. Several of these special institutions, however, served very useful purposes.

Dr M'Lean said that he had long felt very strongly on this subject, and his opinion of his profession was not so high now as it was in his student days. The junior medical practitioners—especially those who have to start without money or friends, feel that gratis special dispensaries are a nuisance. These institutions are injurious to the necessary and legitimate charities in the city, such as the Infirmary, because they absorb contributions which should go to the funds of these charities; and he believed that the special diseases would be equally well treated in the Infirmary as they are in the special dispensaries. They are injurious to the profession, because many of those who frequent them for advice are perfectly able to pay a regular practitioner; and sometimes it happens that a medical man finds that his patients go to these places to get a second opinion. They are injurious to the public, because they tend directly to pauperise the people, and destroy a healthy sense of independence, by encouraging habits of improvidence.

Prof. Young said that special institutions were entitled to some consideration, as affording admirable means of study to the junior members of the profession in departments not taught in the ordinary curricula. This was the point of view in which they were defended by their advocates, and the defence would be a valid one, if the leading professional appointments in them were held on the same footing as those in general hospitals. At the same time, he believed that the functions which they discharged would be performed more efficiently were special wards in large hospitals set apart for the reception of the patients at present treated in detached special dispensaries. By thus concentrating them into one institution, they would be placed under the control of responsible medical men, and security would be given to the public that their charitable contributions were economically administered, and to the teaching bodies and students that methodical instruction in these special branches would be efficiently conducted. It was true that the introduction of special departments in a general hospital considerably increased the working expenses of the institution; but the question of expenditure was comparatively an unimportant one, as the increased outlay would be made up by the saving to the public purse in having the contributions of the benevolent administered by one central house, instead of, as at present, by several independent bodies.

Dr James Stewart quite agreed with the last speaker as to the propriety of concentrating several of the special institutions into the Infirmary, though it would be advisable to leave a separate hospital for eye diseases. The most objectionable feature in the present system was the way in which these dispensaries were advertised. This could not be for the benefit of the students, who all knew very well where these institutions were situated, without having the fact of their existence and locality blazoned in their faces by public advertisement. This system was one to be strongly deprecated and discouraged, as in every way unprofessional.

Dr Renfrew said that it was not alone the advertising system which was discreditable, but the way in which these institutions were got up. It was well known that they were often started by practitioners desirous of bringing themselves into notice; these practitioners managed to interest their personal friends, and these again influenced others; it was represented that a special institution was wanted in some locality, and soon it was brought before the public fully organized. Another evil is that the same men continue in them from beginning to end, and this had a contracting influence on these men's minds, and made them frequently take a narrower view of their professional pursuits than would be taken by one engaged in the various departments of the profession.

Dr Fleming said that these institutions might be regarded from two points of view,—the charitable and the educational. In both aspects the Royal Infirmary was an indispensable institution; it was required by the public, and necessary as a clinical school. On the whole, also, the Eye Infirmary might be set down as necessary both to the public and the medical school. The diseases of the eye are so very numerous, of so frequent occurrence, the characters of the diseases are so peculiar, and the treatment so very delicate and refined, that it requires an immense amount of experience to become an adept in ophthalmic diseases. One Eye Hospital was, however, quite sufficient for this city. Again, not indeed as a charitable institution, but for the purposes of teaching, a Maternity Hospital might be considered necessary. It would be exceedingly injudicious and dangerous to have a Lying-in Hospital in connection with a general Infirmary. On this account it is perfectly justifiable to have as an educational institution a separate Maternity Hospital. Lock Hospitals for females may also be justified on the ground that the patients will be more secluded in a private institution than in a public hospital. In the case of males, the disease should be treated in a general hospital. As regards special stations for vaccination, they could hardly help themselves. The Privy Council have issued a regulation that every parochial surgeon in England must possess a certificate bearing that he has been specially educated and examined at a station recognised by them, and hence these stations have been established at the seat of most of the medical schools. In regard to the general question, he at one time thought that these institutions for vaccination were scarcely necessary apart from their educational character. On reflection, however, he was convinced that as vaccination is not a disease from which escape is possible, but a preventive of a fearful disease, and since unless this prophylactic measure be thoroughly applied, its benefits to the individual and the community are lost, and seeing, also, that by law every child must now be vaccinated,—on these grounds he held a paternal government like ours to be justified in demanding that every practitioner holding a public appointment should be able to perform the operation effectually. With the exceptions above enumerated, he held that there was no call for private dispensaries.

Dr Morton said that while agreeing with Dr Fleming as regards the necessity of the Infirmary, the Eye, the Lock, and the Maternity Hospitals, he demurred to the alleged necessity for Vaccinating Dispensaries. The operation was one of the most simple and trifling character. It would be much more reasonable to exact a special diploma for proficiency in passing the catheter, or for treating diseases of the eye, or venereal diseases. He held, however, that though such diplomas would be more useful, and are more called for than one for ability to vaccinate, the system of giving several diplomas for proficiency in various subjects was an evil. He had long held that the possession of one diploma should be sufficient evidence that the holder of it had been found qualified to pursue any and every branch of medical practice.

Dr Fleming declined to follow Dr Morton in an irrelevant discussion on medical reform. He would only again point out that the element of distinction between a certificate of proficiency in vaccination and a certificate of qualification to perform any other operation, such as passing the catheter, &c., was that vaccination is an operation to which every person *must* be subjected, and this could not be predicated of any other operation, nor of any disease. The Vaccination Certificate was intended to give a guarantee, not only that its holder could perform the operation, but that he was acquainted with the appearance of the vesicle in its various stages—whether it be sufficiently large to protect the child from small-pox, and whether it runs a healthful and proper course.

Mr Reid said that the discussion had taken a turn somewhat different from that which he intended. His object had been to elicit the opinion of the Society as to the existing gratis special dispensaries, and in particular in connection with the practice of advertising; and if this opinion were unfavourable, to suggest that some steps should be taken by the Faculty and by the Society to express in a practical way their disapprobation of the conduct of those of their members who are connected with these institutions—in fact, that these gentlemen should be requested to give up such practices as those referred to, which are utterly derogatory to the dignity of the profession, as well as of those bodies of which they are members.

SEVENTH MEETING, 5th March, 1870.—Dr Steven in the chair.

Mr John Speirs, Surgeon, 465 St Vincent Street, was elected an ordinary member.

Dr Macleod was to have introduced a Discussion on the extension of the Contagious Diseases Act, but was prevented from doing so by an unexpected professional call. In his absence, a discussion on the subject did take place; but as the arguments adduced are fully exhibited in the report of next meeting, no farther notice of it is necessary.

EIGHTH MEETING, 19th March, 1870.—Dr Steven in the chair.
Dr Macleod read a paper on

THE CONTAGIOUS DISEASES ACT.

He began by referring to the natural hesitation with which one consented to discuss this subject, and the desire felt by every one to keep it out of sight as long as possible. Until the wide ventilation which it had recently received in the public prints had removed his reluctance, he shrank from bringing the subject before the Society. For many years some professional men had tried to obtain legal interference with the immoral traffic which polluted our social system, but public opinion had not till lately been sufficiently pronounced to enable the legislature to interfere. The terrible ravages of venereal disease in the army and navy at last forced those in power to take up the subject. In this way the Contagious Diseases Act of 1864 was passed. The further Act of 1866 was the suggestion of a Government commission, and guided by the experience thus obtained it was now proposed to extend the sphere of the Act to the civil population. Dr M. proceeded to show (1) That prostitution, however vile and detestable, had existed from all times, and might be called a necessary consequence of evil in unregenerated humanity. No law, however stringent, could extinguish it. As long as it was supposed that by closing the eyes the evil could be removed, no good could be done. It would be better to look it straight in the face, and devise measures to mitigate it. That was the *object* of the present enactment. (2) The various causes giving rise to prostitution were reviewed, such as the obstacles to early marriage, vanity, the inadequate remuneration of many female employments, dislike to settled occupation, the love of amusement, intemperance, seduction, desertion, and possibly poverty. (3) The extremely good effects produced by the administration of the existing Act in Malta, Gibraltar, and Corfu were spoken of from Dr Macleod's own observation. The testimony of medical men in various places in which the Act was in operation showed how much prostitution had diminished, and its worst features had been mitigated, as well as how many fallen women had been reclaimed. (4) Dr Macleod strongly dwelt on the ignorance which existed as to the proposed scope of the Act. There was no intention of *licensing* brothels; it was only desired to remove their secret and injurious character, and deprive their guilty inmates of the power of injuring the community as at present. To recognise the existence of prostitution, and take measures to limit and control it, was not to license it. As well might it be said that the recognition and punishment of theft was licensing theft. It was proposed to provide special hospitals for the treatment of venereal cases, into which women notoriously prostituting themselves should be forced to enter when diseased, and that in order to determine their healthiness or the reverse periodical examinations should be enforced. Without such enforced examinations, it would be impossible to look for any good from the Act.

No certificate whatever was to be given to the women (in this respect the system differed entirely from the Continental one), and the carrying out of the Act was to be in the hands of a special body of select police. That these officers would bring respectable women within the scope of the Act was as unlikely as that respectable men would be taken up as thieves. The officers would also be open to prosecution and punishment at the hands of any person wrongly accused. Dr M. strongly questioned the right of the State to legislate from a mere moral point of view. When an evil affecting a large portion of the community was made apparent, he believed it to be the duty of the State to correct that evil, irrespective of its moral bearings. The duty of the State is to secure the greatest amount of good and safety for the majority. The various objections which had been advanced against the Act were then considered *seriatim*, and shown to be without weight. Dr M. strongly insisted that the onus of proving the Act to be wrong fell on its opponents, as it was the legitimate carrying out of modern principles of legislation. The terrible ravages of venereal disease were strongly dwelt upon, and the necessity there was of clearing our streets, in the interests of respectable members of the community, from the pests who nightly invaded them.

Dr Tannahill said that so long as he had taken the provisions of this much-talked-of Act at second-hand, he was opposed to its being extended to the civil population; but having recently carefully perused the Act, he saw very little which was objectionable in its details, while he cordially approved of its principle.

Dr Lyon objected to the Act chiefly from its moral bearings. In this view he held that it directly encourages prostitution, by giving State support to the care of prostitutes. Its principle was to keep the women in the best possible condition for the worst possible purpose. The disease was presumably intended as a punishment for unchastity, and the dread of it acted as a deterrent. He held that both the men and the women indulging in the vice, and spreading venereal disease, should be punished by the State, and that it was not consistent with the functions of the State to cure these women at the expense of the nation.

Dr Graham (Paisley) sympathised with the objects of the proposed Act, and did not believe that the fear of syphilitic infection acted to any appreciable extent in deterring men from the vice.

Dr Hugh Thomson said that the great obstacle in working such an Act would be found to consist in the difficulty, if not the impossibility, of framing a satisfactory practical reply to the question, What is a prostitute? The difficulty of legislating effectually on this subject centres in the answering of that question. A superintendent of police lays information before a magistrate that he believes a woman to be a prostitute. But on what grounds, in a city like this, is such belief to be based? Men not unfrequently make a mistake in addressing virtuous women, under the impression that they are prostitutes, and might not the police similarly err? If the act was confined to women found soliciting on the street, it might work well enough; but it would be an intolerable grievance to have virtuous women frequently apprehended. And unless the Act was so worked as to embrace in its operation the larger part of the prostitutes, it would be ineffectual in preventing the propagation of disease. When attending the Clinique of Ricord at the Venereal Hospital in Paris, the male patients used to be asked the source of the disease, the two formulas generally being, "*Une fille publique?*" and "*Une bonne amie?*" and it was noticeable that much the larger number replied, "*Une bonne amie*," showing that the majority of cases arose from intercourse with females not known to the police as public prostitutes at all.

Dr Adams thought that the possibility of stamping out the evil by means of the provisions of an Act of Parliament was an idea which could hardly enter the mind of any experienced medical man. The animal passion is so influential as a motive power in the actions of men, that he had even heard the opinion stated by a gentleman present that it operated more influentially over the minds of men, more deeply permeated the motives of men, than any other single principle. To wholly eradicate the evils attendant upon the exercise of a passion so deeply implanted in human nature, was an impossible task; but it was quite possible to mitigate these evils. To his mind it had been clearly shown that to the extent to which this Act had been worked, its results had been satisfactory, and this afforded presumptive proof that its further extension would be advantageous to the general community. Many years ago he had been interested in some statistical researches into the amount of syphilitic disease in various countries and at that time he had been impressed with the fact that in Continental towns it was very much less prevalent than in Britain, and this difference was satisfactorily accounted for by the Continental system of periodic examination. He thought the present question was one of so great importance that they would be justified in expressing their opinion of the Bill to the Legislature.

Dr Rice said that the fact could not be gainsaid that in the garrison towns in which it had been put in force the Act had diminished the amount of prostitution. For the women themselves the Act would be a good thing, as it will put them into better condition to ply their trade. It was, however, another question how far it will diminish the demand. He had seen no statistics to prove that in garrison towns the demand had fallen off; on the contrary, it rather appeared that the prostitutes were very greatly overworked, some of them receiving from 16 to 20 visits in 24 hours. Government was quite justified in passing the Act, as the question had to them its financial aspect. But the extension of the Act to the civil population would be attended with many difficulties. Even the setting apart a special class of police officers to work the Act would not prevent the occurrence of many mistakes. A case was on record of a decent married woman who would have been submitted to examination but for the circumstance that the examining surgeon personally knew her. He would therefore object to the proposed extension of the Act to the civil population, though he thought it quite proper to give it a further trial in garrison and seaport towns. He thought, however, that short of the provisions of such an Act, a good deal might be effected by the police surgeons inspecting the women known to be prostitutes, and that Government might supply another hospital in Glasgow, so as to provide the means for those infected with syphilis.

Dr Eben. Watson said that the insuperable objection to his mind to the extension of the Act to the civil population was that it involved the necessity of licensing or officially recognising certain places as brothels, and this appeared to him to be opposed to correct principles of legislation; and the result would be that the fast young men about town, knowing that certain places were licensed and their inmates periodically inspected, would conclude that the evil was at least respectable. With regard to solicitation in the streets, Dr Macleod is aware that though the Continental system has abolished this on the part of the females, that solicitation on the part of males is perfectly common, and often more successful than would be that of females.

Dr Gairdner said that the present legislation of this country on the subject under discussion was founded on the principle that the whole overt act of prostitution as a matter of business, and the places where it is so carried on are illegal. Now, his objection to this Act was that it departs entirely from this theory. It was evident that the definition of a prostitute involved the statement that she was known to frequent a brothel, and that this implied a prior recognition of places existing for immoral purposes. There was ample room, he thought, for carrying out more effectually our present legislation, and for new legislation in the same tract. Public solicitation in the streets should be put down, and the police were most desirous to put it down, but the great difficulty was the want of evidence, the only available testimony being generally that of policemen, which was often insufficient to convict. Dr Macleod had put before them very strongly one side of this very ticklish question, but it had a double aspect. The promoters of this Bill were extremely anxious to show that it is not the Continental system which they want to introduce, yet on the other hand they point to the Continental streets as proving the great benefits which would accrue to society by the adoption of this measure. There could be no doubt that there is a feeling of decency in the Parisian streets which you cannot experience in the cities of this country. But when they begin to look a little deeper beneath the surface, they are constrained to put the question,—Is this Continental system as much better than our own system, as the absence of female street solicitation would imply? His own belief was that in almost every Continental city the actual prevalence of vice was enormously greater than it was in this country, and that the Continental system fosters a callousness of feeling, and deteriorates the public tone to a degree which he had no desire to see introduced into this country. You have the public brothels, regulated, licensed, and kept beautifully clean and free from disease,—but by the very fact of all this public care and attention, young men are trained to look upon indulgence as a necessity of their nature, and the resulting demoralization is deep and extensive. There was, indeed, no public solicitation by females, but there was another form of it still more loathsome—by means of males. If you once lose sight of the fundamental principle of the legislation of this country on this subject,—that prostitution as a matter of trade is a thing to be put down by law,—then you inevitably drift into the position of recognising the whole class of prostitutes to be under special legislation. There was one direction in which they had not gone far in the way of legislation. The communication of contagious disease is clearly an offence. By the present Health of Towns Act, a person so exposing himself as to communicate the contagious disease from which he is suffering is guilty of an offence in law, and can be punished. He did not see any objection whatever to making the communication of venereal disease an offence in law.

Dr Morton, while he had a dislike to legalise or license prostitution, or indeed put it in any form under the government, yet held that much could be done in the way of repressive means. He would rejoice in any measure which would prevent the contamination and punishment of the innocent.

Dr Renfrew, after adverting to the statistics of prostitution in Portsmouth, as they have been beneficially affected by the Act, said that it seemed to be forgotten that police officers in their official capacity were responsible to the law. Then again, it was not the common class of constables to whom it was proposed to entrust the working of the Act, but a separate class with a special training. Dr Rice's plan would simply be carrying out that of the Act in a more objectionable form. He did not participate in the fears which had been expressed that as a people we would be demoralised; as a people our national moral habits were different from those of our Continental neighbours, and the proposed system was essentially different from the licensing system of the Continent. One strong argument in favour of the Act was, that under its operation many women had been reclaimed, and even children from 11 to 16 years, engaged in the traffic, had been rescued from a life of infamy and misery.

Mr John Reid pointed out one aspect of the question to which Dr Macleod had not adverted—viz., the probability that under the operation of such an Act open prostitution would be smothered up, and driven into the interior of society, as had happened in so many Continental towns. When this happened, it would be impossible for any official, no matter how great his experience, to discriminate between the virtuous woman and the prostitute, and he held that one error would do more real harm than a thousand cases of venereal disease.

Dr Ritchie said that to his mind the moral aspect of the question so preponderated as to have very great weight with him in deciding as to the propriety of the contemplated legislation. In looking at the history of the question, he saw nothing more strongly stamped upon these Acts than the infringement of high moral law. Admit the principle of this measure, and they at once admitted a principle at variance with the law of God, and, this being the case, the Bill must fail to do good, and must necessarily do harm. God had said, "Thou shalt not commit adultery;" this Bill in effect said, "Prostitution is a necessary institution." The law of God and the law of man are therefore, in this matter, directly at issue. The Bill legalises prostitution, sets up an establishment of prostitution, makes prostitution respectable, renders it reputable and safe. As a therapeutic agent he believed that it would prove a failure. He was at present engaged in preparing a scheme which he believed would go a great way in obtaining a remedy for the existing state of things at garrison and seaport towns. The principle of the scheme was a systematic examination of the males, and this scheme he would take another opportunity of bringing forward.

Dr Macleod, in replying, said that there were two fallacies which had been continually cropping up during the whole discussion. The first was that it was contemplated to license brothels. Now, there existed no ground for such an assumption. With respect to the present legal position of these houses Dr Gairdner was in error; a brothel is not unlawful, provided it is managed in such a way as not to attract attention or offend public decency. Another fallacy which ran through the discussion was that Government had to legislate for the morals of the people. This was an entire mistake. With regard to the contrast which some speakers had drawn between this country and the Continent, he might say that he had lived in all the countries alluded to—in France, Germany, Italy, and Russia—and he had never heard of the Continental system having in any way increased the spread of syphilis, or that there was any movement to have that system superseded; nor had he any recollection of being accosted by pimps in any Continental city, though he did not deny that the system might be to some extent in operation. Dr Ritchie had adverted to the religious aspect of the question, and quoted the seventh commandment; but that same decalogue contained the precept, "Thou shalt not steal," and would any one say that because the law takes cognisance of thieves, this is countenancing, recognising, or licensing stealing? Dr Rice's proposal admits the principle of the Contagious Diseases Act, but carries it out in a more objectionable form. As to Dr Lyon's idea that syphilis was intended by the Supreme Being as a punishment for man's sin, he would ask, Is not typhus fever in the same category? and was it intended that the innocent should suffer as well as the guilty? In his capacity of surgeon to the Lock Hospital he had come to learn that every year prostitutes left the ranks and settled down into married life, and bear children. Are these children also to be punished? Are we to fold our hands in idleness, till the whole community becomes saturated with this disease? The possibility of a virtuous woman being charged with being a prostitute was precisely on a par with the possibility of an honest man being charged with being a thief. The officer would also be liable to prosecution; and the fact of a special corps of officers being set apart to carry out the provisions of the Act does away with a host of objections against it on the plea that it would be vexatious and inquisitorial.

The discussion was adjourned till 1st April.

NINTH MEETING, 1st April, 1870.—Dr Fleming, President, in the chair.

THE ADJOURNED DISCUSSION ON THE CONTAGIOUS DISEASES ACT.

Dr Wolfe thought the question by no means simple; it had many aspects and involved many difficulties. It had struck him in listening to the discussion that one class of objections to these Acts refuted another class. The first objection urged against the measure was that syphilitic disease has been introduced by Providence as a punishment for sin, that the object of this measure being to do away with the punishment, the sin will be carried out with impunity, and will thus become luxuriant. But strange to say, another class of objectors had asked them to look at the Continent, where similar enactments are alleged to have failed to effect any diminution in syphilitic disease. On this part of the subject truth probably lies in the middle. These measures can only moderate it and keep it in check. It was at present impossible to walk through the streets after dark without being solicited by prostitutes, and by this means a large number of persons who would never have thought of indulging in the vice are led into it. The evil not only stared them in the face, but pulled at their coat-sleeves. There cannot be the slightest doubt that this obtrusive display of the supply immensely increased the demand, and as a consequence increased the amount of syphilitic disease. Now, it is a great step in advance to have street solicitation made a misdemeanour, and these women who frequent brothels, and the keepers of such houses, brought under the inspection of the law. By another class of writers it had been urged that by the very fact of legislating on the subject they would render prostitution respectable. But it was rather a curious kind of respectability which was the result of police surveillance. He believed that the effect of the measure would be the very opposite of this. There was one point on which great care would require to be exercised, viz., in the selection of the officers to whom the working of the Act would be entrusted. Having said so much on behalf of the Contagious Diseases Act, he was bound to add that there was one objection to it which, to his view, would be fatal to its success. It would be impossible by inspection of the females alone to guard against syphilitic affections. To render any measure efficient for such a purpose, the males also would require to be systematically examined. It was impossible, also, to resist the conclusion that a bill, the fundamental principle of which is an inspection of the females, would be radically unjust, and would excite feelings akin to those produced in trials for concealment of pregnancy, where the whole punishment lighted on the unfortunate female, while her seducer was allowed to go scot free.

After a few remarks from Drs Howatt and Steven pointing out how little information was really at their disposal which would furnish grounds for any conclusion, the discussion closed.

EXHIBITION OF PATHOLOGICAL SPECIMENS.

Dr Macleod exhibited

I. *A Large Neuromatous Tumour.*—This was a large specimen of neuromatous tumour, excised from the posterior tibial nerve. It was interesting, he said, as being a good example of a form of neuroma external to the nerve, and attached to the sheath. He removed it by simply incising the cyst-wall, and turned out the tumour without injuring the nerve. The operation was unattended by any pain. The tumour was also interesting as being only one of many found on the patient, who was altogether a curious pathological specimen. Three different kinds of tumour were found on him—neuromatous, multiple fatty, and cystic. The one which he excised was the only one which gave him any real annoyance.

II. *Specimens of Cancer of the Penis.*—*Dr Macleod* said that he had within the last year performed the operation of amputation of the penis five times. Four of the cases were epithelial disease, and occurred in persons affected with congenital phymosis. The fifth case appeared to be one of scirrhus. Dr Macleod then described his mode of performing the operation, which will be given in a future number.

III. *Forceps for Commanding Hemorrhage* in the operation for hare-lip and the removal of epithelioma. A description of the instrument will be found in this Journal for November, 1869, p. 75, and it is figured in this number, p. 388.

IV. *A Syringe for Removiny Pus* from psoas or large lumbar abscesses. A description of the instrument will be found at page 386.

V. *Splint for Syme's Amputation at the Ankle Joint*, which he had got constructed for the purpose of facilitating and promoting the adaptation of the flap.

VI. *A Modification and Improvement of the Glue Bandage for Fractures.*

VII. *Specimen of Cancer of the Upper Jaw*, in which the bone was entirely removed. The operation was by no means a difficult one, as it was often represented, and was attended with little hemorrhage. In this case, as well as another in which he had recently operated, no single vessel was tied, and there was union by the first intention throughout. The deformity was very slight. He added that he had recently performed the operation of excision of the upper jaw in a child ten months old.

VII. *Specimen of Tumour from the Head* of a child 2½ years old, who received a blow on the right side of the head, which was followed by the ordinary result—the formation of a bloody tumour. Four months afterwards, when he saw the child, a tumour 4½ inches long by 2 inches broad occupied the whole side of the head. It was as hard as marble, and the skin over it was little affected. On examining it, he suggested to the students that it might probably turn out to be a bloody tumour which had undergone organization, though it would be a remarkable fact if in the space of four months this process had been so complete. He cut through the tumour, but he found it impossible to dissect it from the scalp, and therefore he cut straight down to the bone, where he found soft blood, and turned out the tumour from below. On examination, he found it to consist of various layers in different stages of organization; and the most superficial, about an eighth of an inch in thickness, assumed all the characters of a fully organized fibrous tumour.

Dr Coats said that the fact of Dr Macleod having been unable to watch the tumour through its whole course must somewhat detract from the value of his opinion that it had undergone this remarkable metamorphosis.

Dr Adams suspected that what appeared to be organisation was simply consolidation. There was a class of tumours found on the heads of new-born children, exceedingly hard, and sometimes with hard ridges, which not unfrequently gave rise to the fallacious idea that the stratum is bony, the bone having been organised from effused blood. On being subjected to microscopical examination, however, it was found to be simply a consolidated mass. He doubted Dr Macleod's case was one of similar character.

Dr Wolfe held that blood, when effused, might be organised into any tissue. Some time ago he had operated on an eye, after an injury of four years' standing, and he found in the choroid one of the ciliary circles forming half a bony ring.

Dr Hugh Thomson said that it was remarkable that no absorption had taken place. It was a rare thing for effused blood, especially when subcutaneous, to remain so long in that condition.

Dr Macleod was satisfied, from microscopic examination, of the correctness of what he stated in this case.

Obituary.

THE LATE DR ANDREW ANDERSON.

Dr Anderson was the eldest son of the late James A. Anderson, Esq., of Carlung, Manager of the Union Bank, and was born 24th October, 1817. His maternal grandfather was a leading practitioner in Glasgow, while the founder of the Andersonian University was a grand-uncle. There was therefore a hereditary predisposition to medicine, and to it he devoted himself. He studied in the University of Glasgow, from which he obtained his degree in 1839, and subsequently proceeded to Paris for a short time. We may form a good idea of Dr Anderson's ardour as a student from his first publication, a pamphlet on typhus (1840), which is founded on "Observations made during a Residence of Two Years and a Half in the Glasgow Royal Infirmary, eighteen months of which were devoted exclusively to the care of patients in the Fever Wards." The subject (typhoid being comprised under the title) is treated in a manner which exhausts the method he adopts—the statistical. It is seldom that the student period is marked by a piece of work so thorough.

Dr Anderson began practice in Glasgow, and was almost immediately appointed Lecturer on the Institutes of Medicine in Anderson's University. In 1846 he was transferred to the chair of Practice of Medicine. His progress as a practitioner was quiet and gradual. When, about three years ago, failing health compelled him to abandon general and confine himself to consulting practice, he had one of the best practices in the city. For some years Dr Anderson had been one of the Examiners for Degrees to the University of St Andrew's, and at this period of his life his own University appointed him one of the Examiners in the Faculty of Medicine. In 1868 the Fellows of the Faculty of Physicians and Surgeons conferred upon him the honourable office of President, which he accepted with some misgiving, lest his health should prevent him from discharging its duties in the thorough manner which alone could satisfy his conscientious nature. As it was, we know that often when well aware of the injurious consequences, he appeared in his place in the president's chair. The disease (renal), whose slow but sure progress he could follow with that sad assurance which is the penalty of medical knowledge, advanced finally with rapid strides, and Dr Anderson died in office, 28th January, at the age of 53. He married a daughter of the late James Reddie, Esq., Town-Clerk of Glasgow, who survives him with an only son, a young man of great promise.

We may consider Dr Anderson's character, in three aspects—as a man, as a practitioner, and as a teacher. His character as a man permeated and beautified his life in all its aspects. The Rev. Dr Henderson, minister of Free St Enoch's, in which church he was an office-bearer, writes thus in an obituary notice published in "The Free Church of Scotland Monthly Record" for April:—"The main strength, certainly the great charm of his character, lay in a high, and pure, and amiable *morale*, in which a vigorous conscience and a loving heart were happily conjoined; and which, under the control and guidance of Christian faith, wrought together to form in him a man of simple and unpretending, but true and acknowledged worth. . . . While the style of his Christianity was simple and unobtrusive, at the utmost distance from formality or ostentation, and sitting upon him with the ease and grace of a second nature, its power was seen and felt regulating his life in all its relations and concerns."

As a practitioner Dr Anderson was careful, exact, and painstaking, never grudging time or labour. He delighted in the practice of his profession; "he was to his patients not only the wise physician, but the spiritual friend."

As a teacher, we are told that "there have been few more able and popular lecturers. He was a great favourite with his students, often the best test of successful teaching." His "Introductory Lecture to the Course of Practice of Medicine" (1846), is a good illustration both of his matter and his style. The matter is clearly and carefully arranged, and the style is lucid and eloquent. Dr Anderson's remarks on Dispensary Practice, which he advises his students to eschew, are thoroughly characteristic of the man, and in themselves are worth quoting. "I am doubtful of the good it does to the Physician, forced to prescribe in haste—studying no case—keeping no record, though he sees interesting cases now and then. But I am NOT doubtful of the injury it does to the junior student. The diagnosis *may* be accurate—the prescription *may* be exactly fitting—the result *may* be a perfect cure, but that student has not followed the steps of the process. He gets little good of the case before him, and he goes away with hastily formed and often erroneous notions. A general impression of the facts he may carry away,—if those be facts at all which are known only by halves,—but the finer shades, which often give the indication for the scientific choice of treatment, he has entirely missed, and, worse than all, he has been acquiring the bad habit of superficial practice, sure in the end to work him woe. But, gentlemen, far be it from me to say that Dispensary practice might not be made available to students, and especially to those more advanced. Were cases classified, and the medical attendants multiplied; and had each man a department of his own with which he might become familiar; and were divers hours or places fixed for these various divisions, so that the unhappy Doctor was not forced to leap most dangerously, within five minutes, from Delirium to Dysentery, from Cataract to Catarrh, from Tinea Capitis to Onychia maligna; were careful records kept of each individual case, which the Physician might refer to, and the student consult;—I adventure to say that if you can find out *such* a Dispensary, you may study *there* safely and to profit." Besides the "Observations on Typhus" already alluded to, Dr Anderson published in 1845 a valuable paper "On the Postfebrile Ophthalmitis," with a plate from his own sketches; in 1847 a paper "On the cause of Scurvy;" in 1848, "Reports of Cases Treated at the Glasgow Eye Infirmary," of which he was a physician. In 1861 an "Outline of the Course of Lectures on Practice of Medicine, for the Use of Students," was published by Churchill, and also "Lectures on Fever," a volume which was received by the profession with great favour. Several minor contributions to medical literature also appeared in contemporary Journals.

THE LATE DR JOHN GORMAN.

Dr John Gorman was born in 1802 of humble parents, his father being a weaver in Cambuslang. He was himself brought up to that trade, but acquiring a thirst for knowledge and an ambition to better his condition, which is not rare in the craft, he became associated with a local literary association, and ultimately "went to college." His first intention was to enter the Church, but even after five years' study with this view, he turned to medicine, chiefly under the influence and at the instigation of his friend Dr Thomson, Lecturer on Anatomy.

Dr Gorman became a Licentiate of the Faculty of Physicians and Surgeons of Glasgow in 1834, and settled at once in the ancient town of Rutherglen. There he spent a laborious and useful life, and there he died, 10th March last. But little more can be said of the hard-wrought practitioner in a mining and agricultural district. It may be added that Dr Gorman's work and worth were recognised by the people of Rutherglen. In 1850 he was presented with a chest of surgical instruments, a purse of 110 sovereigns, and a brooch for Mrs Gorman,—"The gift of the Inhabitants of the Burgh and neighbourhood of Rutherglen, to mark their appreciation of his indefatigable professional services and kindly bearing towards all classes of the community, during a period of nearly twenty years." Some ten years later, after a severe illness, Dr Gorman found himself in possession of a brougham and horse, fully equipped, thoughtfully presented by the same appreciative people. Continuing their respect to the last, his funeral was a public one, and during the ceremony all business was suspended in the burgh. Superficially, Dr Gorman's manner was somewhat blunt, but he had a good and gentle heart. The recollection of his visits, gratefully interrupting the troubled fancies of a fevered brain, still enables the writer of this notice to understand how "the doctor" may be longed for, and how his kindly presence may be efficient when the materia medica is useless.

THE LATE DR FRANCIS HAY THOMSON.

DR FRANCIS HAY THOMSON, whose untimely death—under circumstances which give to it a significance truly tragical—we now record, was born at Gifford Bank, Haddingtonshire, on the 2nd of February, 1814. He was the son of Mr Adam Thomson, accountant, Edinburgh, and nephew to Mr Thomas Thomson, advocate, a well-known antiquarian and historian, and to the Rev. John Thomson, of Duddingston, the eminent landscape painter, who has been termed the Scottish Claude. He received his education in the High School of Edinburgh, and subsequently in the University of Edinburgh, where he was a student of some mark, especially in the classes of his relative, Professor Pillans.

Having chosen his profession at an early age, he first served an apprenticeship to Mr Thomas Hutchins, dentist, Edinburgh. For some time afterwards he was an assistant at Halifax, in Yorkshire, and subsequently to this he commenced practice in Edinburgh, where he remained for five years. During this period he attended, at the University and at the Extra-Academical Medical School, all the classes necessary for a medical qualification, and obtained, after examination, the degree of M.D. of the University of Jena, in 1843. While resident in Edinburgh, his family connection threw him much into the society of men whose names are still familiar as ranking among the first intellects of their time. Thus, though a young man, he enjoyed not the acquaintance merely, but the friendship of such men as Professor Wilson, Lord Robertson, the Ferriers, and others, an advantage which, we doubt not, told upon his character and his future career.

A good opening occurring at this time in Glasgow, Dr Thomson, acting on the advice of his friends, left Edinburgh, and from that time till the end he has laboured among us—how successfully, how genially, with what good will to all men, we need not tell. He arrived in Glasgow in 1843, resided first in Hope Street, and some years afterwards in the house which he bought in Brandon Place. It was his delight to embellish his home from time to time with articles which he selected with much taste and judgment, the result being a collection of gems, pictures, china, &c., which is well known both in Scotland and elsewhere. His success from the first was marked. His reputation as a thoroughly trained dentist and an accomplished gentleman had preceded him; his Edinburgh friends, including those above-named, interested themselves in his success; and the result was that he soon took, and maintained to the last, the highest position in the city as a dentist. He became a licentiate of the Faculty of Physicians and Surgeons in 1858, and was admitted as a Fellow of that Corporation in 1866.

Such was his career; but this notice would be incomplete indeed were we not to say something of the man. The first thing in Dr Thomson's character that attracted the notice even of a casual observer was his indomitable energy. This found vent first of all in the thorough discharge of his professional duties. But there was beyond a superabundance of this force which directed itself from time to time into various channels, not all leading to his advantage, but which are far too numerous to detail. To one or two, however, we may briefly advert.

Always an earnest student of chemistry, he turned his attention in his leisure moments to metallurgy, his researches extending over many years. In the course of these he took out two patents, one in 1849 for "An Improvement or Improvements in Smelting Copper or other Ores," and another in 1857 for "Improvements in the Manufacture of Iron." The first of these patents consisted in mixing copper ores with whinstone, iron slag, and barilla, the fusible silicates and other materials forming a cheap and efficient flux. The other was for an improvement in the blast furnace. The use of the oxygenous gases causes, as he showed, a too rapid combustion or decarbonisation, and, consequently, exhaustion of the substance of the iron. To obviate this, to retard the process of decarbonisation, and thus to form a purer and tougher metal, he proposed to mix the common air supplied to the furnace with a carbonaceous gas, such as coal gas. The mechanical part of the invention is a double-blowing tuyere, one tube carrying the hot air, the other the carbonaceous gas. Both these patents attracted considerable attention, but to the inventor they brought nothing but anxiety and pecuniary sacrifice. The ideas are now merged in other patents, of which others reap the fruits.

His love of and devotion to art was another prominent feature in his character. He was long—and again with pecuniary loss—a Director of the Glasgow Art-Union. He was one of the originators, and, throughout, one of the most energetic managers of the Glasgow Institute of the Fine Arts, an institution which, after many struggles, has now attained a position which causes many to marvel. As an art critic and art patron he was universally recognised; and as an amateur artist his acquirements were by no means contemptible. He lacked, of course, that delicacy of manipulation which long study and severe training can alone engender; but his management of colour, and the effects which he often produced on his canvas with but little work, seemed to show that the mantle of his uncle would have fallen upon him, had he but chosen art as a profession. He was President for several years of the Philosophical Society of Glasgow, and was at his death President of the Odontological Society of Edinburgh.

Mere eulogy is a sorry compliment, even to those who, dying, deserve it most; so we shall say but little as to the personal qualities of the deceased. There are persons who judge of men and of things by externals. To such, a brusque manner may be construed as implying that kindliness of heart is swamped in force of character. We shall not stop here to impeach their belief in the abstract; but if any one ever judged Dr Thomson by such a standard (and it is possible that this may have occurred) they little knew the man. The younger branches of his family, to whom he stood in their early life in the position of father, know the contrary. The widows and families of more than one of his friends, who have been left without help or guidance by the swift stroke of death, know that to his untiring, unparalleled energy their present comfort is due. But it was reserved for the most intimate only of his friends to recognise the full extent of his true benevolence and earnest sympathy in sorrow as in joy.

He was married seven weeks before his death, and was brought home in his coffin from his wedding tour. We add no more than this—that a warmer, truer, kindlier heart never ceased to beat than when, in London, on the 21st of April, Francis Hay Thomson died.

Medical Intelligence, &c.

THE UNIVERSITY OF GLASGOW.

Close of the Session.—The occasion of the conclusion of the last session in the Old College attracted an unusual number of the students, as well as of their friends, to the Common Hall on Friday, the 29th ult. To all but the students of medicine, who have still the summer session before them, this was the leave-taking. The venerable Principal intimated that the bust of Zachary Boyd, and the old staircase, with its two guardians, of doubtful zoology, are to be transported to Gilmorehill. The conclusion of his address seems worth quoting, both for its elegance of expression and the apt moral drawn from the occasion:—"In conclusion, let me remind you that the fate now impending on those buildings awaits each of us. Those fleshly tabernacles of ours, like these ancient buildings, must fall to pieces, and, when that doom will be executed on all of us, well will it be for us if it can be said that we have as truly fulfilled the ends of our creation as this venerable pile has answered the purpose for which it was erected." After the "capping" of the medical graduates, Dr Cowan, as Promoter for the year, addressed them shortly, dwelling chiefly on the responsibilities of the profession.

THE FACULTY OF PHYSICIANS AND SURGEONS.

The Presidency.—Dr John Gibson Fleming has been appointed President of the Faculty in room of the late Dr Anderson, who, it may be noted, was the first President who died in office.

The Watson Prize.—At a *pro re nata* meeting of the Faculty held on the 5th March, the "Dr James Watson Prize" was awarded to Mr Hugh Cunningham, student of Anderson's University, for the best essay on

"The Chemical Changes effected on the Air and on the Blood in Respiration." The President announced that the subject for the next year's competition is "The Anatomical Relations and Physiological Functions of the Sympathetic Nerve." Mr Duncan, Secretary of the Faculty, will be happy to explain the conditions.

GLASGOW ROYAL INFIRMARY.

Changes affecting the Medical Staff.—We congratulate Dr J. G. Fleming on the changes (they are also essentially reforms) which he has effected in the rules of the Royal Infirmary. In principle, although not in detail, the proposals contained in his able "Letter to the Managers" have been adopted. As finally passed they are as follows:—1st, That the Physicians and Surgeons be elected for a period of five years, being eligible for re-election. 2nd, That any of the Physicians and Surgeons may give Clinical Lectures, subject to such conditions as may from time to time be laid down by the Managers. 3rd, That the ordinary Medical Staff of the Infirmary shall consist of five Physicians and five Surgeons (the present number being four). 4th, That the hour of visit shall be 9 a.m. (being half an hour later than at present).—We can only hope that all the benefits anticipated by Dr Fleming, both to the Institution and to the School of Medicine, may in course of time be developed from these changes.

Seventy-fifth Annual Report—The Report for 1869 tells of increased usefulness and prosperity. The large number of 6119 patients was admitted, the increase being wholly attributable to the prevalence of fever in the district. This number was distributed as follows:—To the Medical Wards, 2214; to the Surgical, 2165; to the Fever, 1731; and to the Small-Pox, only 9. In addition, 16,855 patients were treated at the Dispensary. The revenue was not increased in proportion quite equal to these demands upon the resources of the Institution. It fell short of the expenditure by £70 2s. Various important matters affecting the administration of the Hospital have engaged the attention of the Managers during the past year. New Washing-houses have been erected, and on the site of the old they propose to build a new Dispensary, and apartments for nurses. They also agreed to open negotiations with the Senate of the University, the Senate taking the initiative, desiring to affiliate their new West-End Hospital to the Royal Infirmary. These negotiations close in the meantime with a statement signed by Professor Allen Thomson, "for the representatives of the University." The chief obstacle arises from the anxiety of the Senate to ensure that intimate union of the Medical School and the Hospital which is essential to its success, and for this end they wish to appoint the medical staff and regulate the hours of teaching of half the new Hospital. We confess that we are not surprised as to the result of these negotiations. It is doubtful whether either Institution would be benefited. The Directors of the Infirmary could hardly administer one hospital on one principle and the other on another. So far as the expressed opinions in these documents enable us to judge, the desired combination would illustrate the effects of putting new wine into old bottles.

In our remarks upon the Report of last year, we pointed to the defective nomenclature and classification of diseases adopted. We cannot announce any improvement in this respect in the present Report. It is quite evident, however, that this much-needed reform must begin with the medical officers of the house. Each individual case must be registered with regard to the ultimate classification by those whose duty it is to compile the tables of diseases. We would suggest a conference as the best means of securing a nomenclature and classification possessing some claims to scientific accuracy and unity. Still, even making every allowance for defective material, we cannot quite apologise for such absurdities as these—the placing of "Occipito-Atlantoid Disease" under "Diseases of the Nervous System;" of "Pyelitis" among "Diseases of the Circulatory System;" of "Scorbutus" among "Diseases of the Integuments," &c., &c. Failing the adoption of some system, we would recommend a simply alphabetical arrangement.

Amusement, as well as instruction, may be obtained from the Royal Infirmary Annual Report. Under "Donations, &c., for 1869, we read—"Munro, Archibald, Police Inspector, being a bribe left at his house during his absence by a shebeen-keeper, in the vain hope that he would forget his duty as a Police-Inspector, and connive at the illegal traffic, £1." Mr Munro could not have advertised his virtue better, even by expending his pound-note on the *Glasgow Herald*.

DISPENSARY FOR DISEASES OF THE SKIN—ANNUAL REPORT.

During the past year 1076 cases of skin disease and 333 of diseases of the ear have been treated at this Dispensary. The income has exceeded the expenditure by £154. Nearly £1900 have been accumulated for the Building Fund. We are glad to hear of negotiations for the provision of distinct wards in the new University Hospital, which will both enhance the resources of that Hospital for educational purposes, and prevent the needless multiplication of public charities. The careful classification of diseases appended to the Report renders it a document really trustworthy and useful for statistical purposes. The number of students enrolled during the year was 43.

MEDICO-PSYCHOLOGICAL ASSOCIATION.

The members of this Association resident in Scotland and the North of England held a meeting in the Faculty Hall, St Vincent Street, on the 27th ult. Professor Laycock, of Edinburgh, occupied the chair. We regret that our space will not permit us to give more than an outline of the proceedings. After the transaction of general business, the Report of the Therapeutic Committee on certain questions relating to the uniform recording of cases of insanity was read by Dr Clouston. It was approved, and ordered to be printed and circulated. The following papers were then read:—1. The Testamentary Capacity of the Insane, by Drs Gairdner and Howden. 2. Boarding the Insane in Private Licensed Houses, by Dr Alexander Robertson. 3. Two Cases of Rheumatic Insanity, by Dr Clouston. 4. The Classification of Mental Diseases on a Pathological Basis, by Dr J. B. Tuke. 5. Clinical Instruction in Insanity, by Dr Sibbald.

GLASGOW MATERNITY HOSPITAL QUARTERLY REPORT.

From November 15th, 1869, to February 15th, 1870.

The first fatal case—a primipara—was one of puerperal fever. On admission, the patient was greatly exhausted from illness during pregnancy. She was delivered by the forceps, the uterine action being very inefficient. On the following day peritonitis supervened, when she and the nurse were at once isolated from the other patients, and no other case of puerperal disease occurred, though the Hospital was full at the time.

The second case—also a primipara—was one of puerperal convulsions. The patient had been suffering from extensive renal dropsy for three weeks. The labour and convulsions had begun before admission. As soon as practicable she was delivered of full-sized, healthy twins while in a state of coma, in which state she continued till her death 16 hours after delivery.

The third case—a second confinement—was one of powerless labour, with contracted pelvis and post partum hæmorrhage. On admission she was extremely anæmic and weak. The first stage of labour was very protracted from insufficient uterine action, and the second stage perfectly powerless. She was delivered with the forceps, there being considerable hæmorrhage from inertia of the uterus. She gradually sank from exhaustion, and died on the ninth day.

	MOTHERS.				INFANTS, &c.												Maternal Deaths.
	No.	Social Condition.			No.	Males.		Females.					Presentation.		Operative Cases.		
		Married.	Widows.	Single.		Alive.	Still-born.	Alive.	Still-born.	Twins.	Premature.	Abortion.	Normal.	Abnormal.	Forceps.	Version.	
In-door	87	13	1	73	88	49	4	32	3	1	0	0	85	4	2	0	3
Out-door	220	191	3	26	222	97	13	97	15	2	13	0	214	7	5	2	0*
Total.....	307	204	4	99	310	146	17	129	18	3	13	0	299	11	7	2	3

Average weight of child at full time over 87 cases,	7·35 lbs.
“ length “ “ “	19·29 inches.
“ weight of placenta “ “	1·4 lbs.
“ length of cord “ “	22·05 inches.

Average Duration of Labour.

Primiparæ (47 cases).	Multiparæ (40 cases).
1st stage 12·3 hours.	1st stage 8·38 hours.
2nd “ 1·4 “	2nd “ 1·6 “
3rd “ 4·9 minutes.	3rd “ 8·4 minutes.

Greatest weight of child at full time,	10 lbs.
“ length “ “	24 inches.
Least weight “ “	4½ lbs.
Least length “ “	16 inches.
Greatest weight of placenta, - -	1¾ lbs.
Least “ “ - -	1 “
Greatest length of cord, - - - -	34 inches.
Least “ “ - - - -	6 “

PHILOSOPHICAL SOCIETY OF GLASGOW.

The Session which is now nearly closed has been unusually rich in papers and discussions more or less interesting to the medical profession. We may enumerate the following:—“On Defects of House Construction in Glasgow as a Cause of Mortality,” by Dr Gairdner. A Sequel to this paper, with the same title, by Mr D. G. Hoey. “A Glance at some of the Vital and Social Statistics of Glasgow in 1869,” by the City Chamberlain, Mr West Watson. “On the Sanitary Aspect of Architecture with reference to Glasgow,” by Bailie Salmon, Architect. “On Defects in House Construction,” by Mr M‘Intyre. “On the Examination of Air,” by Dr Angus Smith.

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* The Medical Officers of the Hospital are, of course, not responsible for the accuracy of the returns of fatal out-door cases.

AYR, NEWTON AND WALLACETOWN DISPENSARY AND FEVER HOSPITAL ANNUAL REPORT.

The in-door work of this institution is on a very small scale, amounting to 32 admissions last year. At the out-door department, on the other hand, 1337 cases were treated. The House-Surgeon's intelligent report shows how useful a few hospital beds may be made in stopping the spread of epidemic disease in a community. The inhabitants of Ayr seem to recognise this, judging from the balance in the treasurer's hands.

BOOKS, PAMPHLETS, ETC., RECEIVED.

The Presence of Organic Matter in Potable Water always Deleterious to Health; to which is added, The Modern Analysis. By O'Brien Mahony, L.R.C.P., Ed., &c., &c. Second Edition; Revised and Enlarged. pp. 112. Dublin: Fannin & Company.

Reports on the Progress of Practical and Scientific Medicine in Different Parts of the World, for the Year beginning June 1st, 1868, and ending June 1st, 1869. Edited by Horace Dobell, M.D., &c., assisted by numerous and distinguished Coadjutors. pp. 646. London: Longmans, Green, Reader, & Dyer. 1870.

A Treatise on Medical Electricity, Theoretical and Practical, and its Use in the Treatment of Paralysis, Neuralgia, and other Diseases. By Julius Althaus, M.D., &c., &c. Second Edition; Revised and partly Rewritten. pp. 676. London: Longmans, Green, & Co. 1870.

Letter to the Managers of the Glasgow Royal Infirmary. By John Gibson Fleming, M.D. 1870.

Hysteria: Six Lectures delivered to the Students of St Bartholomew's Hospital, 1866. By F. C. Skey, C.B., F.R.S., &c., &c. Third Edition. pp. 122. London: Longmans, Green, Reader, & Dyer. 1870.

Clinical Observations on Hydrate of Chloral as a Hypnotic in Typhus. By James B. Russell, B.A., M.D., Physician to the City of Glasgow Fever Hospital. *(Reprinted from the Glasgow Medical Journal.)* pp. 16. Glasgow: Dunn & Wright. 1870.

Cases of Syphilitic Affection of the Third Nerve, producing Mydriasis, with and without Ptosis. By Victor de Meric, F.R.C.S., &c., &c. pp. 10. *(Reprinted from British Medical Journal.)*

Report by the Imperial Academy of Medicine respecting the Vaccinations performed in France during the Year 1867. Translated and Abridged, with the Arithmetical Proportions of the Statistics, Calculated and Arranged by George S. Gibbs; also, an Appendix of Statistics relating to the Years 1865 and 1866. pp. 22. London: Longmans. 1870.

Dr J. Coats—Wie ändern sich durch die Erregung des n. vagus die Arbeit und die innern Reize des Herzens? Aus dem Physiologischen Institute zu Leipzig. Vorgelegt von dem wirklichen Mitgliede Prof. C. Ludwig. Mit 4 Tafel und 9 Holzschnitten. *(Reprinted from Berichte des kön. sächs. Gesellschaft der Wissenschaften, 1869.)*

DUNN AND WRIGHT, PRINTERS, GLASGOW.

THE

GLASGOW MEDICAL JOURNAL.

August, 1870.

Original Articles.

I.—THE FORCES WHICH CARRY ON THE CIRCULATION OF THE BLOOD.

By ANDREW BUCHANAN, M.D., *Professor of Physiology in the University of Glasgow.*

PART III.—THE PNEUMATIC FORCES.

SECTION 2ND.

PHYSIOLOGICAL PHENOMENA BY WHICH THE INFLUENCE OF PNEUMATIC FORCES IN THE LIVING BODY IS ATTESTED.

WHILE the foundation of the doctrine of pneumatic forces must consist in a demonstration of the physical principles on which they rest, a still more interesting and equally convincing part of our argument consists in pointing out and explaining the numerous physiological phenomena which attest the influence of these pneumatic forces operating within the living body.

The phenomena here in question are peculiar conditions of the circulation, indicating the operation of a pneumatic force; some of them indefinitely, merely pointing to the existence of such a force at or near the centre of the circulation, while others are manifestly connected with the act of respiration.

Without pretending to give a complete analysis of these phenomena, I shall advert to and endeavour to explain some of the most striking, and in doing so I shall adopt the twofold division of them indicated above, beginning with the latter as the most remarkable.

I.—PNEUMATIC PHENOMENA REFERABLE TO THE ACT OF RESPIRATION.

(1.) *Inspiration and expiration—effects of, on the veins, arteries, and capillaries.*—The changes produced on the whole vascular system by the act of respiration are of the most remarkable kind, and serve strikingly to illustrate and confirm the explanation here adopted of them.

When any of the great veins which enter the chest—the sub-clavian, the jugular, or the inferior cava—are exposed to view in a living animal, they are seen at every inspiration to shrink in size, losing their cylindrical shape, becoming flattened, and as if so far emptied of their blood as to be no longer distended. This change takes place just at the same moment that the external air begins to enter the mouth and nostrils, and continues exactly the same time as the inhalation of the air; moreover, it is the more conspicuous and extended the deeper the inspiration—that is, the more air that enters the lungs, so that it is impossible not to refer to a common cause the shrinking of the veins and the entrance of air into the lungs; and as it is certainly known that the latter depends upon the elasticity of the external air, which is just the same as its pressure, so we infer that it is the pressure of the external air that empties the great veins of their blood, and forces it into the chest.

At every expiration again, or rather interval between the end of one inspiration and the beginning of another, the veins swell out and resume their rotundity; and as these are phenomena the very opposite of those attending inspiration, it has been erroneously inferred, that they proceed from the very opposite cause, the blood being supposed to be forced backward into the veins by the compression of the chest in expiration. We have seen that the blood within the chest undergoes no compression during expiration, and that having once entered the circum-pulmonary cavity it cannot again flow out, as it is retained there on somewhat the same principle as water is retained in a bird-fount, the pressure upon it within the chest being less than the pressure of the external air. The true cause of the swelling of the veins during expiration is that after the termination of an inspiration, no more blood, or very little, enters the chest till the beginning of the next inspiration, and the consequence is that the blood propelled onward by the force of the heart accumulates in the veins near the chest to an extent proportionate to the length of the interval.

The changes described above are not confined to the great veins penetrating into the chest, but are visible, though less conspicuous, in all their larger branches, more especially on deep inspiration. In the smaller veins again, no such changes can be perceived by the eye, but it does not follow that they do not really take place: as must be obvious from considering how rapidly the aggregate area of the veins increases as they recede from the heart; and that at every point the dilatation and contraction of the area of each vein is inversely as the aggregate area; and still farther, that it is only the change in the diameter of a vein that is visible to the eye, and that the diameter is as the square root of the area. Whence the visible contraction and dilatation of the veins at every point is inversely as the square root of the aggregate area of the veins at that point, and this rapidly decreasing ratio must soon render these changes in the veins altogether imperceptible. We are here therefore obliged to part company with M. Magendie and the physiologists of his school, who, relying solely on their experiments made upon living animals, maintain that the aspirative power of the chest over the blood extends no farther than the veins which visibly diminish in size during deep inspiration. In opposition to that view we would appeal to purely physical experiments, of which the conditions can be rigorously determined. Such is the experiment detailed above in which the aspirative power of a caoutchouc bag extended over the whole of a piece of lamb's gut, twelve feet in length, as it would have done had the gut been ten times or any number of times longer. Another experiment bearing equally on this subject is that in which the liquid was sucked without impediment through capillary apertures in a brass disc. Such experiments as these remove all difficulties from our path in adopting the opinion that the aspirative power of the chest extends over the whole sanguiferous system—veins, capillaries, and arteries; and physiological evidences are not awanting in support of it.

The arteries are affected by the act of respiration as well as the veins, but it is not indicated in the same way. There is no visible shrinking of the arteries during inspiration, or expansion of them during expiration and the period of repose. But changes in the interior of an artery, of which the eye cannot inform us, are discriminated by the touch. Thus the blood injected into the radial artery by each stroke of the left ventricle of the heart occasions no visible augmentation of its diameter, but communicates to the finger the very distinct sensation which we denominate the arterial pulse. Now, according to the united testimony of all physiologists, the pulse is less voluminous and feebler during inspiration, and recovers its volume and strength during expiration and the period of repose.

To explain these changes of the pulse it has been supposed that the blood is forced backward from the arteries into the chest by the pressure of the atmosphere during inspiration, so making the pulse weaker; while the compression of the chest forces the blood out, and so renders the pulse stronger during expiration. But both these explanations are inadmissible. The reflux of blood along the arteries into the chest is completely prevented by the superior force of the stroke of the heart, assisted by the sigmoid valves and elastic coat of the arteries; and as has been shown above, no compression of the blood in the chest occurs during expiration to give additional strength to the pulse. It is the very same cause which produces the shrinking of the veins and the feeble and small pulse of the arteries during inspiration; for the atmospheric air pressing upon the whole blood-vessels alike, the blood goes in whatever direction there is least resistance; and as all reflux through the arteries is prevented by the propulsive force of the heart and the sigmoid valves, the whole current sets in the opposite direction towards the chest, through the arteries, and from them through the capillaries and veins. The fuller and stronger pulse during expiration and the period of repose is due to the same cause as the refilling of the veins. It is no new or intensive force added to that of the heart, but the mere restoration of the force which had been subducted in inspiration, by the blood then rushing toward the chest, through the veins and arteries alike.

Neither can it be objected that there is no evidence from observation to shew that there exists in the smaller blood-vessels the alternate emptying and filling which we perceive in the large veins and arteries, and have ascribed on theoretical grounds to the blood-vessels universally. We have explained above how it cannot be seen in any individual small vessel, but in the aggregate blood-vessels pervading the soft substance of the brain we have occasionally opportunities of witnessing it in a most conspicuous form. Cases of injury of the head are to be seen from time to time in all our great hospitals in which a portion of the bones of the cranium having been removed, the brain is exposed to view, sometimes still invested with its fibrous covering, (dura mater), but often denuded, and sometimes protruded outwards, constituting the affection named "hernia cerebri." In all such cases we see an alternate movement of the substance of the brain corresponding exactly to the movements of respiration, the brain shrinking and receding into the cranial cavity during inspiration, and again swelling out prominently during expiration and the period of repose. Now it cannot be doubted that this alternate movement proceeds from the emptying and refilling of the blood-vessels of the brain; and as the large vessels bear a very small proportion to the smaller, it is manifest that it is to the latter mainly, that these very remarkable movements are to be ascribed.

We see also in the exposed brain another but much slighter movement of expansion and subsidence, corresponding to the action of the heart, which it is easy to distinguish from the slower and more extensive movements depending on respiration.

(2.) *Oscillations of the Hæmastatic Column.—Entrance of air into the veins.*—Exactly of the same significance are the oscillations of the hæmastatic column first observed by Hales. In his numerous experiments on horses and dogs, after the arterial blood had risen to its full height, he observed it rise and fall 2, 3, or 4 inches at each beat of the pulse, and then of a sudden it would fall and rise 12 or 14 inches on the animal sighing deeply or struggling. More exact observations have since shewn that these more extended oscillations correspond exactly to the movements of respiration; the column falling suddenly during each inspiration, and again rising slowly during the intervals from one inspiration to another; and the extent of the fall always corresponding to the depth of the inspiration.* These oscillations take place both in the arteries and in the veins, and correspond exactly in the moment of their occurrence, like the indications of the needles of a telegraph placed far distant at the two extremities of the electric wire. No experiment could be devised more conclusive than this to show that the influence of the pneumatic force of the chest extends over the whole vascular system; for at the moment of inspiration, the weight of the atmosphere bears down the column of blood simultaneously at the very beginning of the arteries and at the very end of the veins, thus rendering it quite certain that the same pressure takes place also at every intermediate point.

As the veins become smaller the oscillations become less extensive, just like the visible changes in the diameter of the veins. This diminution of the range of the oscillations as we recede from the heart, whether in the veins or in the arteries, has never been interpreted in its full significance; and will, hereafter, be looked to with great interest, seeing that correct theory shows the range of the oscillations in the blood-vessels at any point to be inversely as the sectional area of the blood-vessels at that point, and of course directly as the velocity of the blood in the vessel subjected to experiment.

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* Magendie.—*Phenomènes Physiques de la vie.*

The depression of the arterial column produced by inspiration is small in relation to its total height; but the venous column near the heart is only one tenth as high as the arterial, and the depression of it from inspiration is relatively very great. It may be diminished to one half, or a quarter, or still less, and may even disappear altogether, and then the external air forcing its way into the vein would be carried with the current of blood onward to the heart, just as has been known to take place in operations in the vicinity of the cavity of the thorax in which large veins have been laid open. Great feebleness of the heart on the one hand, and, on the other, sighing or other very deep inspirations are the causes which conspire to occasion the entrance of air into the veins; as must be obvious from considering that the former makes the hæmastatic column low, and the latter make the fall of the column great.

(3.) *Asphyxia, or cessation of Breathing.*—Whenever the act of breathing ceases from whatever cause, whether from submersion in water, from tying the windpipe, from obstructing the aperture of the mouth and nostrils as in suffocation or smothering, or from compressing the windpipe as in hanging or garotting—if there be a complete arrestment of the respiratory movements, a condition of the whole system is induced which terminates in death in about three and a half minutes, and may be regarded as the *experimentum crucis* of the doctrine of the pneumatic agency of the chest.

When the act of breathing ceases the heart is deprived of all assistance from the pneumatic force of the chest; it has now to contend single-handed against all the resistances which oppose the onward movement of the blood—a task for which its utmost efforts are ineffectual; it labours and palpitates in vain: the blood accumulates in the capillary vessels of the system and, more especially, oppresses the brain, which it does the more readily that it is now no longer as oxygenated blood, but as black or venous blood, that it stagnates in the cerebral vessels: loss of consciousness, of sensibility, and of all other forms of nervous energy speedily ensue, and these are the forerunners of the extinction of life.

I am aware that this doctrine of the nature of asphyxia—that it consists essentially in the inability of the heart to propel the blood through the systemic blood-vessels—is in opposition to all the explanations of it now taught in the schools of medicine; but it is a legitimate deduction from the doctrine of the pneumatic force of the chest here advocated, and must stand or fall along with it.

I may merely mention the current doctrines of the nature of asphyxia in the order of the times when they were first propounded, without entering into any critical examination of them. The doctrine of Haller was, that when the breathing ceased the heart was no longer able to propel the blood through the pulmonary blood-vessels. Goodwyn and Bichat both ascribed the death which occurs in asphyxia to unoxygenated blood; which the former regarded as no longer capable of stimulating by contact the surface of the left ventricle of the heart, while the latter held that it destroyed the irritability of the muscular substance of the heart by circulating through the coronary blood-vessels.

Dr Allison's doctrine, that the flow of blood through the pulmonary capillaries necessarily ceases, because the blood is no longer oxygenated, can only be accepted by those who believe in the influence which the act of oxygenation is supposed to exert over the progress of the blood.

(4.) *Fœtal Circulation.*—But, it will be asked, if the respiration be necessary to carry on the circulation, how can it be performed in the fœtus in which there is no respiration. A most appropriate question certainly, and suggestive of a very important answer. The force of the left ventricle alone may be insufficient to propel the blood through the systemic capillaries, and yet the force of both ventricles combined may be able to do so. Now in the fœtus the two ventricles combine their strength to drive the blood through the system, and succeed in doing it. An important conclusion follows. If the same amount of force be required to carry on the systemic circulation immediately before birth in the fœtus and immediately after it in the new-born child, then the pneumatic force of the chest must be exactly equal to the force of the right ventricle of the heart; or according to the estimate deduced from Hering's experiment above cited, it must be somewhat more than one half of the force of the left ventricle.

But mathematical accuracy does not belong to physiological questions, in which we must be content with an approximative answer. It is impossible to prove that exactly the same force is required to carry on the circulation of the fœtus immediately before birth, and that through the systemic circuit of the newly-born child. There are certain circumstances that might incline us to think that the former would require more force: seeing that at birth the whole length of the umbilical cord and placental vessels is subtracted from the sanguiferous circuit; the blood which occupied these vessels being now reposited in the lungs, and the right ventricle of the heart being detached to keep it in motion; so that the left ventricle might still be equal to the duty left to it to perform. On the other hand, the whole blood of the body still requires to be propelled from the left ventricle to the right side of the heart; and it may be asked if that would not be more easily done, when a large portion of the blood flowed through the lax vessels of the placenta and the wide venous duct, than when the whole of it had to be forced through the undilated capillaries of the general system, now for the first time receiving so great a tide. I incline, decidedly, to this latter opinion, which implies, that from the moment of birth the systemic circulation cannot possibly go on without the aid of the pneumatic force of the chest; unless, indeed, it happen, as in an interesting case mentioned below, that the fœtal passages being still pervious, the right ventricle is enabled to come to the rescue, and the circulation is temporarily carried on as in the fœtus by the united efforts of both ventricles.

We shall probably, therefore, not greatly err, if we regard the pneumatic force of the chest at the time of birth as at least equal to the force of the right ventricle of the heart. But as life advances it becomes an agent of gradually increasing importance in carrying on the circulation of the blood. We have seen from the experiments described in last section, (pp. 22–24) how effective pneumatic forces are in overcoming the resistance due to the inertia of liquids. Now, the inertia of the blood depends on its weight and on the quantity of it which accumulates in the blood-vessels, more especially in the veins. This inertia is least in the fœtus and newly-born child, but it gradually increases as life advances. The development of the chest and depth of the respiration keep pace with it till middle life, when the influence of the pneumatic force over the movement of the blood is highest. With advancing years again, a more plethoric state of the veins is apt to occur, while the influence of the pneumatic force of the chest is becoming feebler and more variable, and this occasions danger to life from sudden congestion of the blood-vessels of the brain—a danger quite analogous to that which we have just described as threatening or destroying life in asphyxia. The detraction of blood seems a natural remedy in such circumstances; and this accords with the experience of the physicians of the last generation, however opposite to the inert timidity of the present race of medical men.

(5.) *Transition from Fœtal to Extra-Uterine Life.*—To see a child born, that is, to see it pass from the state of an aquatic animal, in which it has spent its intra-uterine life, to that of an air-breathing animal, which it assumes as soon as it comes into the world, is one of the most striking of the many wonders which physiology everywhere holds out to those who cultivate it.

I have always exercised all the branches of my profession, according to the custom which was all but universal among my contemporaries in Glasgow when I commenced medical practice some six and forty years ago. I cannot but regard this custom as much superior to that which our medical corporations are now enforcing of making every man from the beginning select for himself a single branch of the profession. It is true that he may in this way become practically more expert in his own particular branch, but it is at the expense of his general views. He becomes like the man who makes the head of the pin, but has no notion how it is pointed. So it will turn out under this new system, that the men who occupy the highest places in the medical profession will be men of contracted ideas, like tradesmen; and that if you wish to find a man of large views of physiological nature, you must turn to the more humble class of general practitioners who have learned betimes to exercise all the branches of their art. I do not mean that in course of time it is not advantageous for every man to select certain *specialties;* but that must be as taste and reflection, and still more as opportunity and circumstances direct. In my own case, my long-continued connection with the Infirmary here, naturally turned my attention to Surgery, and so I took to cutting for the stone,* to carving out new lips,† and to curing strictures of the urethra by disruption,‡ a principle of treatment which I believe I first introduced into surgical practice. In earlier life, however, I held the office of district-surgeon, where my duties were almost purely medical; and I then took with my whole heart to the fever of our own city,* as I afterwards did at the Cholera Hospital to "the Malignant Cholera."† Now, it would be difficult to persuade me that I would have been a more useful man, or have better fulfilled the duties which I was destined to perform, if, at the beginning of my professional career, I had been starched up with an apparatus round my neck, like that which prevents the young men of the present day from ever turning round their heads out of one direction. To finish this digression. On all of the subjects above-mentioned and on a few more besides, I have given to the public the results of my experience and thought, holding that to be a duty which every medical man capable of doing it owes to his profession and to those who cultivate it. Even the busiest may find time to put a few bricks in their right places in some corner of that vast Edifice—call it rather Temple, as not unworthy of a God —of which, some two thousand three hundred years ago, Hippocrates of Cos laid the foundation stone, and which ever since all genuine disciples of his have vied with each other to establish, amplify, and adorn.

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* On Lithotomy, as performed with a Rectangular Staff. Reprinted from the *Edinburgh Monthly Journal of Medical Science, Feb., 1848.*

On Lithotomy considered as a cause of death.—*Glasgow Medical Journal, April, 1840.*

Three Letters on Lithotomy.—*Lancet, 1868.*

Lithotomy in the female,—in Dr M'Clintock's Clinical Memoirs.—*Dublin, 1863.*

† On a method of restoring the lower lip after complete or partial recision.—*London Medical Gazette, October, 1841.* Second Edition, with Engravings. *Glasgow, 1859.*

‡ Description of a compound catheter for the treatment of strictures of the urethra.—*London Medical Gazette, 1841.*

These remarks are made in extenuation of the grave delict, as some will account it, of my having practised Midwifery: which I freely confess with the aggravation of having always had a pleasure in it, and that for two reasons; first, that it confers upon us the high privilege of seeing woman in her noblest and most interesting phase—at home among her children; and second, which is more pertinent to our present subject, that it supplies us with some of the most important facts in Physiology. I recollect once having been told boastingly by one of the only *pure* physicians we at that time had in Glasgow, that not only had he never delivered a woman of a child, which I would never have imputed to him, but, to show how immaculate he was, that he had never even been in the room when a child was born. I told him that he ought not to lose an hour in going to the Lying-in Hospital, where he would behold a sight truly worthy of being seen—one which no man of well constituted mind, even after having seen it many times before, can again witness without fresh wonder and admiration.

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* Causes and periodical revolutions in the prevalence of fever in Glasgow: in Report on Diseases of the City Poor.—*Glasgow Medical Journal, November, 1820.*

Malaria considered as a cause of fever in Glasgow.—Review of Dr M'Culloch on Malaria, *Glasgow Medical Journal, May, 1828.*

On the Stable Nuisance in Glasgow.—*Glasgow Medical Journal, October, 1853.*

† Observations on malignant cholera.—*Glasgow Medical Journal, 1833* Second Edition. *London, 1848.*

On the constitution and distribution of the blood in malignant cholera.—*Glasgow Medical Journal, April, 1854.*

The fœtus is developed under water and lives in it up to the time of birth. It has, therefore, the organization of an aquatic animal, and the transition which it has to undergo consists in modifying the aquatic organs and assuming those of an air-breathing animal.

So far as this transition can be seen externally, the most conspicuous part of it consists in a series of deep inspirations in which the whole chest is stretched to the uttermost, and this seemingly giving pain, a fit of crying is an invariable accompaniment in a vigorous infant. All this takes place in less time than I have taken to write these words, and yet a complete revolution has been effected in the internal organization which is permanent throughout after life; the circulation of the blood has been completely changed, and the continual presence within the lungs of air containing oxygen in chemical action upon the blood has become an indispensable condition of life.

The lungs of the fœtus having been developed under water and retained in the same medium till birth, the air-tubes and blood-vessels are compacted together, the elasticity of the tissues being completely overcome by the atmospheric pressure telling through the medium of the water upon the pliant walls of the chest and the parts within it. But no sooner does the child escape from the water and make a deep inspiration, than the air, having now for the first time access to the glottis, rushes into and distends the air-tubes and air-cells; the atmospheric pressure which previously told only upon the external surface is now equal without and within the lungs; and the consequence is, that the elasticity of the soft bones and cartilages of the chest and of the pulmonary tissues, which was impotent alone against the pressure of the atmosphere, comes now into play and gives a permanent superiority to the expanding forces. A quantity of air is thus introduced into the lungs which can never afterwards, so long as life continues, be expelled. It increases during inspiration and diminishes during expiration, but the utmost force of the expiratory muscles is unable to expel it.

The medium quantity of air thus introduced into the lungs, or the complement remaining after an ordinary expiration, varies according to the development of the chest in each individual. It can be most accurately measured by restoring after death the original conditions of fœtal life by extracting the air from the lungs by means of an exhausted receiver attached to the trachea; while an incision being made on each side into the cavity of the pleura, the pressure of the atmosphere tells freely on the outward surface of the lungs. In an experiment of this kind which I saw made with great care by the late Drs Jeffray and Ure of this city upon the body of an executed criminal, they found 32·6 grs. of air in the lungs, which is very nearly 109 cubic inches.

If, then, we suppose 18 cubic inches to be taken in at an ordinary inspiration, we have 127 cubic inches as the full complement of air in the lungs during tranquil respiration, and of that quantity almost exactly one seventh is interchanged at each act of respiration.

A change of the very same kind, and from the same cause, has taken place in the blood-vessels of the lungs; into which a quantity of blood has been introduced, which never can be expelled while life continues. Previous to the infant's drawing its first breath the only part of the circum-pulmonary cavity accessible to blood was that of the great veins on the right side of the heart; now it has access also to a wider space on the other side of the right ventricle, and the blood rushes in to fill the pulmonary blood-vessels. It comes in at once wherever the access is readiest. It is drawn out of the aortic system retrogressively through the arteriose duct into the expanding pulmonary arteries, while it is at the same moment forced across the auricles of the heart through the foramen ovale into the pulmonary veins. All this is done in a twinkling, and not slowly by means of the action of the heart, which probably undergoes a momentary suspension during this great cataclysm of organic nature, and when it is at length resumed, every necessary arrangement has been made for the instauration of the new order of things. The right ventricle can never again send the blood through the arteriose duct so long as breathing continues, for at every inspiration it would be drawn backward into the pulmonary artery. The whole force of the right ventricle, therefore, is now devoted to send the blood through the pulmonary artery; and the blood with which the pulmonary capillaries are already filled being now aerated, it is forced through the pulmonary veins to the left side of the heart. Thus the new system of the circulation of the blood is established, and it is soon after rendered irreversible by the closure of the foramen ovale and the obliteration of the ductus arteriosus.

(6.) *Obstetrical notes.*—I conclude this sub-section with some obstetrical notes bearing upon the characters and movements of the blood, and the influence of respiration over it.

Whole blood of the fœtus black.—Some physiologists have taught that the placenta produces upon the blood the same changes as the lungs—the blood being said to be black or venous in the umbilical arteries and of a florid red colour in the umbilical vein. It is easy in cases of child-birth, by some very simple experiments, to show the inaccuracy of this opinion. If, after the child is born, instead of putting two ligatures round the cord and dividing it between them, only one ligature be applied, and after dividing the cord on the placental side of the ligature the blood be collected in a tumbler or other glass vessel, assisting the flow by stripping the cord downward, then from three to four oz. of blood can easily be obtained. Now the blood is never partly of the one colour and partly of the other, but either wholly black or wholly red; and it can be obtained of either colour according to the mode in which the experiment is performed. If the cord be tied the moment the child draws its first breath and cries, then the whole blood, both from the arteries and from the vein, is black; but on allowing it to stand exposed to the air it becomes florid on the surface like ordinary blood, showing it to be quite susceptible of being acted on by oxygen if there had been any of that gas supplied to it by the placenta. We infer, therefore, that the black blood of the umbilical arteries undergoes no change of colour in passing through the placenta, but returns through the vein of the very same hue. If again the child be allowed to breathe freely before the cord is tied, then the whole blood obtained from the cord is of a bright red colour, which it has manifestly acquired in the lungs of the child before going to the placenta.

Do the respiratory movements ever occur before birth?—If the muscular act corresponding to inspiration were performed before birth when there is no possibility of air finding access to the lungs, it is manifest that the whole pnuematic effect would be to draw the blood from the systemic veins into the chest. Does nature ever employ this expedient to assist the circulation of the fœtus, either within the uterus or during parturition, especially when from compression of the cord or other cause, the progress of the blood may be impeded? I am disposed to answer this question in the affirmative, founding my opinion on a case which occurred to me twenty-four years ago. It was a case of twins: the first of which was born easily, but not so the second, for there was an interval of no less than three hours between the births of the two children. When the lower limbs were at length brought down, there was a complete suspension of labour for half an hour, during which the child lay with its chest in the vagina, and the head still included within the uterus. As the cord was felt beating regularly and vigorously, I did not deem any interference necessary; still, however, I could not avoid satisfying myself from time to time as to the pulsation of the cord. In doing so, as my finger rested on the ribs, I was surprised to find them move, and on the movement being repeated at regular intervals, my whole attention was fully aroused, and to make my examination more sure, I placed the fingers of the other hand on the opposite side of the chest. I had then full time to satisfy myself that the ribs on both sides of the chest were undergoing alternate movements of elevation and depression, resembling exactly the rhythmic movements of respiration. All this took place at a time when, from the position of the child's head within the uterus, access of air to the mouth and nostrils was physically impossible. Strong contractions now came on, and the child was at once expelled.

Were this observation confirmed, it would be important physiologically, as evincing that the reflex acts of respiration are excited by a sense of obstruction to the passage of the blood through the heart, and not by any feeling connected with the aeration of the blood and seated in the lungs, which are dormant before birth.

I need scarcely say that the question here proposed is quite different from that which has been so much discussed, of the child actually inhaling air and crying before birth.

I may add that ever since, whenever an opportunity offered, I have carefully sought for the same phenomena, but never with success, although never with a perfect correspondence of conditions in the mother and child.

Whether any similar movements occur *in utero* might be judged of from observations made on whelps still within the transparent amnion; or just extruded and placed, before they have breathed, under water, where it is well known they can live for hours.

Twins, one of which unconsciously sucked his brother's blood, and so deprived him of life.—This case occurred fourteen years ago. I can find no memoranda made of it at the time, but the history of it was so remarkable that the essential points are as fresh in my mind as if it had taken place yesterday.

The labour on the part of the mother was easy. The child first born was remarkably vigorous, drawing up its limbs, struggling and respiring deeply. It seemed to be fullblooded, the face being tumid and somewhat livid, and the whole surface having a similar hue. It cried lustily before the cord was tied, and there was no unusual delay in tying it. The other child presented a marked contrast to the first. It was pale and exsanguine. It lay fully extended, and never bent a limb, although its joints were quite flexible. It never cried, but after some time a feeble respiration was established. I could not view these appearances without much alarm, and unfortunately the idea of hemorrhage from the placenta presented itself to my mind, and I immediately tied the cord which was still beating, much to my regret on reflection afterwards. The child was kept warm, and was able to take a little nourishment. It continued to breathe feebly, and survived about thirty hours. I may add, that I never saw a more beautiful child than this; its pure white skin resembling Parian marble, and its perfect symmetry coming fully out as it lay straight and with extended limbs, an attitude in which a living child is so rarely seen.

There was only one oval placenta to which both cords were attached. I brought it away with me, and gave it to Professor Allen Thomson, who kindly undertook to examine it. He found free vascular communication throughout every part of it, so that a liquid injected through the vessels of the one umbilical cord returned readily by the other.

It is clear from this history that the child first born, by the vigorous inspirations made during his prolonged fit of crying, filled his own vessels, both pulmonary and systemic, with blood, and so unconsciously drained off from the placenta the share of the vital fluid which should have been the heritage of his brother.

Could the circumstances have been foreseen, the cord of the child first born should have been tied without a moment's delay, so as to prevent any undue draining of the placental veins; while the tying of the cord of the second child should have been deferred as long as possible, that is, till after the expulsion of the placenta, which should have been compressed, and the cord stripped downward towards the child.

Whenever, therefore, a child is weak from want of blood, the greater the delay in tying the cord so much the better for the child: because the umbilical arteries contracting under the influence of the cold, and meeting with a greater resistance from the gradual coagulation of the blood in the capillaries of the placenta, are continually sending less blood thereto, while the aspirations of the child through the umbilical vein are continually becoming stronger under the influence of the oxygenated blood, and the whole difference between the blood sent to the placenta and that drawn from it tells in favour of the child. Besides which the compression of the placenta after extrusion, and the stripping of the cord downward towards the child, give an additional supply of blood, which is the great requirement.

Repeated alternations, after birth, of the fœtal and adult circulations, corresponding to periods of apnœa and respiration.—This case occurred somewhat more than thirty years ago. I transcribe it from my note-book with the title under which it is there inserted, and only leaving out an expression of opinion which I have long since believed to be erroneous.

CASE OF CONGENITAL DEFICIENCY IN THE ŒSOPHAGUS.

The following case is one of great interest, both on account of the very remarkable symptoms which it presented, and the uncommon malformation in which it originated. The infant, which was a male, was born about the eighth month. It cried, but not lustily, on coming into the world, and though small it seemed perfectly well formed in all its members. In about half-an-hour afterwards, when I first examined it carefully, there was a good deal of phlegm in its throat, which occasioned a difficulty in breathing, but the phlegm was at length got up, and the breathing became natural. Everything went on well till the nurse gave it some sugar and water, which brought on a violent fit of suffocation, attended with lividity all over the body. These fits occurred afterwards on every attempt to make the child swallow. There was great difficulty of breathing, with a rattling noise in the throat, and relief was never obtained without a discharge of frothy fluid from the mouth and nose, to promote which the nurse held the child inclined forward with its head depending. But the most remarkable circumstance attending these fits was that in some of the more violent the respiration at length ceased altogether, and continued suspended during a period of about five minutes or more, when the face and whole surface of the body became perfectly livid. The pulse, however, instead of ceasing along with the suspended breathing, became fuller and stronger than before, clearly showing that the blood was taking the course observed in the fœtal state, and not passing through the lungs. The increase of the strength and fulness of the pulse probably arose from the combined impulse of both ventricles being greater than that of the left ventricle alone. This was observed twice by myself, and once by my friend, Dr James Watson,—now the venerable father of the medical faculty in Glasgow,—whom I consulted upon the case. On introducing an elastic catheter into the œsophagus it stopped always at the same point, and on injecting some milk down through it an immediate regurgitation took place, through the nose and mouth. All attempts to give nourishment by the mouth were therefore abandoned during the second day, and although it was clear that the child could not live, it had nutrient enemata from time to time, which, however, had probably little effect in protracting its sufferings. It died fifty-four hours after birth.

On examining the body the œsophagus was found to terminate in a shut sac a little below the bifurcation of the trachea. The tunics of the canal were quite perfect as far as the point where they terminated abruptly, as was distinctly felt on compressing them between the finger and thumb. No trace of muscular fibres could be discovered further down, accompanying the plexus of the par vagum in the posterior mediastinum; but exactly at the diaphragm the œsophagus recommenced. On opening the stomach the œsophagus was found to enter it in the usual way at the cardiac orifice and to extend as high as the diaphragm, where it terminated abruptly in a cul de sac. There was thus a space of about an inch and a half where the œsophagus was completely awanting. The child in every other respect was perfectly formed. The stomach, bowels, and other abdominal viscera were healthy, and the distribution of the great vessels and nerves was normal.

The heart was distended with blood, and the ductus arteriosus full. The foramen ovale appeared to me on my first examination to be quite open, as I saw through it from the right into the left auricle of the heart, but on subsequently opening the left side of the heart also, it was found that the foramen ovale was completely closed by a very thin diaphanous membrane, which had not till then been distinguishable. The membrane, though very thin, was nevertheless entire, so that no blood could pass directly from the one auricle of the heart to the other without rupturing it. From this it is obvious that the membrane must have been organised during the last thirty hours of life, or subsequently to the last attempt to give milk by the mouth, when the fœtal circulation was re-established for the last time.

The fits of suffocation in this case were obviously brought on by the fluid swallowed being stopped at the upper cul de sac of the œsophagus, and in consequence regurgitating, and in part entering the larynx, causing spasmodic closure of the glottis. During the fits of suffocation the fœtal circulation re-established itself, as was obvious from the colour of the skin and the state of the pulse, as well as from the great length of time during which the respiration was completely suspended without the extinction of life. On the fluid being discharged at the mouth and nose by inclining the child forward with the head depending, the spasm of the glottis ceased, and respiration re-commenced by sobbing and crying as in the new born infant when the circulation of the adult was again established. The death seemed to be altogether the effect of exhaustion and not of any fit of suffocation.

To the preceding history, written three and thirty years ago, and the remarks unbiassed by any theory then made upon it, I shall merely add a single observation as to the two paths which the blood may pursue in the newly-born child, in which the fœtal passages, by the foramen ovale and arteriose duct are still patent. If the respiration is going on the fœtal circulation is impossible, and the whole force of the right ventricle is devoted to the pulmonary circulation, so as to keep the pulmonary blood-vessels always full; for without that, at every inspiration a portion of the blood of the aorta would be forced backward by the atmospheric pressure through the arteriose duct. If again the respiration be suspended in the newly-born child the fœtal circulation is restored, as repeatedly occurred in the preceding case; and we have then the whole force of the left ventricle, and the best part of the force of the right directed to propel the blood over the general system, and only a small portion of the latter employed in keeping up an imperfect circulation through the lungs.

II.—PNEUMATIC PHENOMENA OF INDEFINITE ORIGIN.

The phenomena of this class are probably not referrible to any single cause; and may originate from the action of the heart, or of the pleurocardiac apparatus described above. They are best distinguished negatively by the want of those alternations of intensity and relaxation corresponding to the respiratory movements which belong to the phenomena we have just been considering.

They are confined chiefly to the veins and capillary vessels, which are in a state quite different from that which they would assume if the blood were propelled through them solely by the force of the heart; while they are exactly in the state which they would assume if the blood moved under the influence of two forces, the one propelling it from behind while the other draws it onward by aspiration towards the centre of the circulating system.

Without pretending to analyse and enumerate the phenomena of this class, I shall merely select and describe two of them as illustrations of their general nature.

If, according to the former of the two suppositions stated above, the blood were propelled solely by the force of the heart, then it is manifest that the veins and capillary vessels would be in a state of constant distention; for the same force which propelled the blood forwards along the axis of the vessels, would press it also laterally against their coats, and so keep them in a state of turgescence. Further, all vessels equidistant from the heart would exhibit the same degree of turgescence; and the more distant the vessels were from the end of the circuit, that is, from the right side of the heart, their turgescence would, *cœteris paribus*, be the greater.

But how different is the actual state of these vessels! The veins appear, for the most part, to be only half filled. It is only when the blood is prevented from flowing freely towards the heart that they become turgid. The compression of a single vein produces no change upon it, as the blood passes unimpeded by collateral channels. It is only when the whole collateral channels are also obstructed, as by a ligature round the limb, that the blood accumulates in the veins and capillaries and renders them turgid.

The phenomena of venous hemorrhage lead to the same conclusion, or rather present the same argument in different terms. If the heart were the sole moving power, the turgid veins, when wounded, would bleed profusely; the tendency of the blood to issue laterally being greater than its tendency to follow the axis of the wounded vein, for in the former direction it spouts out unopposed, while in the latter it is opposed by the whole column of blood which it has to push onward to the right side of the heart. But how different are the phenomena as they actually present themselves! The flow of blood from a wounded vein generally ceases spontaneously. We have never any trouble in arresting it unless the vein be of such a size, or so situated, that the blood which it carries cannot easily and readily be transmitted by some of the numerous collateral channels, for which the venous system is so conspicuous. Now this is exactly what would take place on the hypothesis of two forces, for the blood issuing through a wound would be opposed by the pressure of the atmosphere, while it would be, as it were, solicited by the central pneumatic forces to pass along the axis of the vein, or if that were obstructed, through some collateral channel.

To make a wounded vein bleed, we are compelled to have recourse to artificial expedients, as in performing venesection, when we bind a ribbon round the arm between the heart and the wound. We thus completely destroy the influence of the pneumatic forces which are opposed to the flow of blood, and allow the propulsive force which is in favour of it to act alone.

SECTION 3RD.

HISTORY OF OPINIONS AS TO THE INFLUENCE OF PNEUMATIC FORCES ON THE CIRCULATION OF THE BLOOD.

Haller was well acquainted with the influence which the act of inspiration exercises upon the movement of the blood in the great veins near the thorax. Much of the description given above is in his words, or in words of similar import. He, however, regarded the act of respiration not as promoting the circulation of the blood, but merely as modifying it, since he believed the effects of expiration to be just the reverse of those of inspiration. He explained the movement of the blood produced by inspiration on the principle of derivation—*vis derivationis.* This, it might be argued, includes the principle of pneumatic force; but Haller certainly did not use the term in that precise sense when he illustrates the nature of derivation, by saying that when a blood-vessel is opened all the neighbouring parts send supplies towards the aperture—*qua, data porta, ruunt.*

To Dr Carson of Liverpool, unquestionably, belongs the credit of being the author of the doctrine of the indispensable necessity of a pneumatic force to carry on the circulation of the blood. During his whole lifetime, indeed, he was zealously occupied in promulgating and defending this doctrine. When he graduated at the University of Edinburgh in the year 1799, he published an inaugural thesis on the subject. This was followed in 1815 by a more formal treatise, of which he published in 1833 an enlarged edition, containing many new arguments and a spirited reply to Dr Arnott and his other antagonists. He believed the pneumatic force to be seated solely in the heart. He rejects the rival views of Sir David Barry as to a pneumatic force seated in the thorax. We owe to him some important observations as to the influence of the elasticity of the lungs which, had he analysed them more accurately, would certainly have led him to a clear knowledge of the pneumatic doctrine; but he very unaccountably restricts the influence of the elasticity of the lungs to the heart alone. Dr Carson also refers to the elasticity of the lungs, the immediate occurrence of the act of expiration on the relaxation of the inspiratory muscles. It certainly concurs with the elasticity of the costal cartilages and the gravity of the parts displaced by inspiration to bring on the act of expiration in a purely physical way.

Sir David Barry, on the contrary, adopts the doctrine of a pneumatic force seated in the thorax, while he denies the existence of any similar power seated in the heart. From the account he gives of the pneumatic force of the thorax, it is obvious that he regarded it as very similar to the force of a common syringe, and that he makes no account of the delicate complication of forces which results from the simultaneous entrance of air and of a liquid into the same expanding cavity. But the great glory of Sir David is his having instituted experiments upon live animals to prove the existence of the pneumatic force of the chest. With respect to the experiments in which he introduced a tube filled with a coloured liquid through an aperture in the thoracic parietes into the cavities of the pleura and pericardium respectively, while the lower end of the tube was immersed in the liquid, it cannot, I think, be doubted that such an experiment would succeed, and the liquid accumulate in the cavities, just as is stated to have taken place. As to the experiment, again, in which he introduced a tube in the same way into the jugular vein, it is difficult to see how the liquid should have flowed inward, and why, on the contrary, the blood did not flow outward through the tube; since it is precisely in that way, only turning the tube upward, that we measure the hæmastatic column which Hales found to stand in the jugular vein of the horse at the height of 12 inches. It is possible, however, when from exhaustion of strength the column fell very low, that the liquid might flow into the vein just as the external air rushes into it in similar circumstances. It might happen also from the pressure of the ligatures binding the animal upon the other veins entering the chest. I can see no reason, therefore, to join with Dr Arnott in discrediting Barry's experiments, and the high authorities by which they are supported.

Magendie had a firm belief in the pneumatic force both of the chest and of the heart. His experiments made in conjunction with M. Poisseuille are of the highest importance, and can never lose their value to physiology, whatever interpretation be put upon them; but certainly, as interpreted by Magendie himself, they do not remove the difficulties or reconcile the alleged inconsistencies of the pneumatic theory. He repeats continually that the chest is neither more nor less than a common pump, but he takes no notice of the manifest difference between them, inasmuch as the chest is destitute of valves which are an indispensable part of the mechanism of a common pump. According to his view, as stated with perfect frankness, the action of the chest is to draw in the venous blood when the ribs are elevated, and to force it out again when the ribs are depressed. He seems to suffer no embarrassment from reflecting that it is difficult to see how the circulation can be expedited by these alternate but opposite movements. Haller held exactly the same opinion, but that cautious reasoner ranks the respiration among the causes which modify and not as one of those which promote the circulation of the blood. The error which underlies the whole of Magendie's doctrine is his belief that the effect of expiration is to force the blood back from the chest into the veins. In the beautiful experiments made with the hæmadynomometer to illustrate the influence of respiration on the height of the mercurial column, he invariably refers the rise of the mercury during expiration to the blood being forced backward by the compression of the chest. It seems never to have occurred to him that the phenomenon might be due to the afflux of blood from behind, rather than to the reflux of it from before. In like manner he held that the influence of inspiration extended only to a limited distance from the chest along the venous system, instead of regarding it as due to the atmospheric pressure everywhere telling upon the blood-vessels, both veins and arteries, and forcing the blood through them in the direction where the resistance is least. The chest certainly resembles a common pump in so far as inspiration is concerned; but here the parallel stops: the common pump is provided with a valve at its inlet which prevents it from forcing the liquid backward. In the chest there is no such valve, but, notwithstanding, the blood is not forced backward. This is provided for by a totally different mechanism, which has been explained above as constituting the essential peculiarity in the structure of the "respiratory pump." In virtue of this mechanism, the blood once within the chest is sheltered from all compression, and has therefore no tendency to flow backward, but accumulates quietly, as in a reservoir, for the supply of the heart. Magendie seems to have relied altogether on his experiments, as attested by the evidence of his senses, without troubling his head about theoretical objections. Thus he takes no notice of the writings of Dr Arnott, although he was, without question, acquainted with them, seeing that he joins in raising the cry of "physiquement impossible" against Sir David Barry, for what reason it is difficult to discover, the opinions of Barry being so nearly identical with his own,—at least, in so far as the chest is concerned, while they differ as to the pneumatic force of the heart, which was recognised by Magendie.

The late Professor Jeffrey, of our own University, was a strenuous advocate for the sucking power of the heart. He was a follower of Carson, and so far as I recollect did not recognise any pneumatic force seated in the thorax. It is to be regretted that his lectures upon this subject, which seemed to be carefully written out, but unfortunately, as I have since been told by his son, unintelligible, from being written in short hand, have never been made public. They certainly produced a powerful impression upon the juvenile auditory to which they were addressed, and made many converts among them, of whom I was one. Not many years afterwards Dr Arnott's thundering denunciation of the whole doctrine appeared in the second edition of his elements of natural philosophy, and was generally believed to have struck it down for ever. I did not see the work for many years afterwards, but having at the time read an account of it, with extracts in the *Edinburgh Medical and Surgical Journal*, and feeling indignant at the author's dogmatism and his unworthy treatment of his opponents and of the whole medical profession, I wrote a criticism on Dr Arnott's views, exposing in particular the fallacy of his "bloodless experiment," and his unfairness in ascribing to Dr Barry opinions he did not entertain for the purpose of refuting them. This criticism was never published, but on lately searching out the old manuscript I was pleased to find it in perfect accordance with the views stated above. Ever since my appointment, in the year 1839, to the Chair of Physiology in the University of Glasgow, I have publicly taught the doctrine of the pneumatic force both of the chest and of the heart, but it was only during the summer of last year that I found time to examine minutely the principles on which it rests.

II.—ON CLINICAL INSTRUCTION.*

By DR M'CALL ANDERSON, *Professor of Practice of Medicine in Anderson's University, Physician to the Royal Infirmary.*

GENTLEMEN, we are living at present in stirring times, when all things, social as well as political, are being critically scrutinized, and when change is the order of the day.

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* Being the Introduction to his course of Clinical Lectures at the Royal Infirmary.

In no department has this tendency to change been more manifest than in the medical, in which we are specially interested; and while we should be careful, on the one hand, lest we trample unnecessarily upon the traditions of the past, especially when these are founded upon solid bases, we should be equally careful, on the other, lest we set our faces against changes which are in accordance with common sense, or required by altered circumstances, merely because they conflict with our conservative tendencies.

In the matter of medical education, for example, the mind of the profession seems to be becoming every day more enlightened, and the time is at hand when the sole power to grant licences to practice will be vested in a central board; when the scramble for licentiates among the various corporations will be at an end, and when the university degrees will cease to be mere licences, but honorary titles, reserved for those who have been tested by more sifting and more scientific examinations, or who have distinguished themselves in medical science, or in the practice of their profession.

It is gratifying to find, too, that in the present day the tendency is to make medical education as little theoretical, and as thoroughly practical as possible; to teach the student how he may best recognize disease, and how he may grapple with it successfully; to put in force the precept of Broussais, that "the real physician is the one who cures," and that "the observation which does not teach the art of healing is not that of a physician" but "of a naturalist." And who that has carefully studied the difficult problem of the relief of suffering and the cure of disease can fail to sympathise with Trousseau when he remarks, "For mercy's sake, gentlemen, let us have a little less science, and a little more art!"*

In some respects, however, there is still much room for improvement, and particularly as regards clinical instruction. At the present time, for instance, every precaution is taken to compel the student to attend with regularity an extensive and varied series of systematic lectures in the class room, while, as regards hospital attendance, at this school of medicine at all events, very little is required of him, except, perhaps, to enrol his name in an album half-a-dozen times in the year; so that, in point of fact, he may, if he chooses, come forward for his final examination without ever having entered the wards of a hospital,—a system which, in the interest of the student himself, no less than in that of the public which must afterwards avail itself of his professional services, surely cannot much longer be tolerated.

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* "Lectures on Clinical Medicine." New Sydenham Society's Translation, Vol. II., p. 44. 1869.

On coming forward for his final examination, the student is compelled to produce tickets, which are presumed to indicate that he has attended a course of clinical lectures,—that is, lectures in a class room such as, in accordance with the existing regulations, we are entering upon this day; but as for true clinical teaching, *i.e.*, bedside instruction, he is entirely his own master, while no encouragement is given to the teacher, who is recompensed for his instruction in the class room, while his teaching in the wards is altogether ignored,—a point which is, however, of no moment, except in so far as the principle which is involved is concerned.

In a pamphlet which was recently written by our esteemed President of the Faculty of Physicians and Surgeons, Dr Fleming,—a gentleman who certainly has the interests of the Infirmary, as well as the dignity and usefulness of the profession, at heart,—it is proposed that all the physicians and surgeons should be allowed to give clinical lectures; but while there is reason to believe that this recommendation was the result of a thorough appreciation of the value of clinical teaching, the immediate effect of it will be to increase the evil, by giving further prominence to class-room lectures, and thus further interfering with ward teaching.

It appears to me, however, that the difficulty could be met were it left to the discretion of each physician and surgeon to give clinical instruction in the way which appeared to him most expedient, leaving it in his option to teach either in the wards or in the class-room, or to combine both methods; and I think it might safely be left to the student to select the teacher whose method of instruction appeared to him best calculated to convey useful and trustworthy information.*

It must not be supposed that I have any objection to the so-called clinical lectures in themselves, although too often they are mere recapitulations of class lectures,—all that I contend for is that bedside instruction—*i. e.*, true clinical teaching—is much more important, and that the former should not for a moment be permitted to interfere with the latter, as has been the case hitherto; and that the student attending the wards of one physician or surgeon should not be compelled to attend the lectures of another whose wards he does not visit, and of whose cases he is therefore ignorant.

Finally, if clinical teaching is to be really valuable, the student—as you yourselves have indicated in your petition to the managers—must be obliged, at the commencement of each session, to join the class of one teacher, and to attend his wards with the same regularity as he attends the courses of systematic lectures at his medical school. Practically this is already done by many of the best students, but there is always to be found a large floating population of students, if one may be allowed the expression, who can derive little, if any, benefit themselves in their migrations, and who interfere very seriously with the studies of the other students, as well as with the duties of the physicians and surgeons.

You will, I am sure, excuse me for speaking thus plainly, for, holding these opinions so strongly, I feel that I would not be discharging the duty which I owe you were I to keep silent, and not to point out what I hold to be the sure path which leads to ultimate success in acquiring a sound, practical knowledge of your profession.

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* This, I believe, the managers have the power to do, without any alteration of the existing regulations.

III.—ILLUSTRATIONS OF DIPHTHERIA AND ITS TREATMENT.

By William Marshall, M.D., *Mortlake.*

Diphtheria is not an uncommon disease in this neighbourhood, and presents itself in many unusual forms. Some four or five years ago an epidemic of measles visited us, and many children died of a form of diphtheria following it, that I have not seen described. Just as they were recovering, and everything seemed favourable, large bullæ formed on various parts of the body, ruptured, the abraded skin became covered with an ash-grey exudation, and in forty-eight or sixty hours they were dead,—and generally without any diphtheritic manifestation in the throat, though that form also frequently occurred. We have just gone through an epidemic of scarlet fever, which, when fatal, was so commonly from subsequent diphtheria. Diphtheria following measles or scarlet fever is a very fatal disease, while that following typhoid fever, on the other hand, is of little gravity. The following cases will, I think, interest those members of the profession who are interested in the varieties and treatment of this disease.

Case I.—Mrs S., aged 23, and eight months advanced in pregnancy, was in delicate health previous to her marriage nine months ago, and has been troubled with cough and other symptoms of phthisis ever since. Eight days ago her throat became sore; she had difficulty in swallowing, but otherwise did not feel much worse than usual. She was seen and prescribed for by a neighbouring practitioner who told her she was suffering from diphtheria. She became rapidly worse, and I was asked to attend her. I found her much emaciated, pallid, harrassed with an incessant croupy cough, great pain in deglutition, profuse ichorous discharge from mouth and nostrils excoriating the upper lip and cheek, and the glands at the angles of the jaw on both sides much enlarged and slightly tender to the touch. The tonsils, velum palati, uvula and back of the pharynx, as far as the eye could reach, were covered with a continuous diphtheritic exudation of a yellowish-white colour, exactly resembling wash leather; the nostrils also could be seen internally covered with the exudation; and from the croupy cough, with expectoration of shreds of lymph, hoarseness and sibilant sound in respiration, I have no doubt the larynx and trachea were also coated. There were all the physical signs of advanced phthisis at the apex of right lung, and in a lesser degree in that of the left. Pulse 120—feeble; skin hot and perspiring; tongue furred and painful at the tip. On the evening of the day I first saw her pains set in, and next morning she was delivered, after an easy labour, of a healthy, plump, but small baby. It was brought up very carefully by hand, and *never presented any sign of diphtheria*, but throve well. Her recovery from the confinement was not influenced in the slightest degree by the diphtheria; there was no manifestation of it about the uterine organs, contrary to my expectation; there was no pain, nor was the lochia affected in any way. There was slight distension of the breasts on the third day, which passed off in a few hours, but there was no supply of milk. She gradually became weaker, dying exactly one month after the birth of the child, worn out by the cough and profuse discharge from the mouth and nostrils, and inability to take any nourishment except weak wine and water and milk. From beginning to end there was not the slightest alteration in the appearance of the throat, notwithstanding the frequent application of tincture of the muriate of iron, hydrochloric acid and honey in equal parts, solution of nitrate of silver, &c., and the internal administration of ammonia and bark, quinine, tincture of the muriate of iron, iodide of potassium and chlorate of potash, &c. No *post mortem* examination was allowed.

CASE II. is that of a baby. Eight days after its birth the mother requested me to look at the umbilicus, as she was afraid the nurse had neglected it. I found it surrounded with a circular patch of diphtheritic exudation nearly four inches in diameter, and around the exudation for about two inches more the skin was intensely inflamed. There was something quite peculiar about the colour of the inflammation,—it was a brilliant, angry crimson, but yet somewhat dark, differing in tint from any other inflammatory redness I ever saw. In the arm-pits were two small but similar patches. The child had been born quite healthy, and still seemed well, though a little fretful; it took the breast freely, and had no difficulty in swallowing. The nurse said that two or three days before, a number of small blisters had formed around the umbilicus, and these had broken, and the part had taken on the appearance it now presented on the previous day. A solution of nitrate of silver (10 grains to the ounce) was applied once daily to the part, and it was dressed with carron oil. The mother, who continued nursing it, took chlorate of potash and iodide of potassium freely. Three weeks later, the sore spots in the arm-pits had disappeared, and the one around the umbilicus had so far diminished that half-a-crown would have covered it. The healing of this sore had been peculiar; it never changed its character; the exudation did not disappear but daily diminished in circumference, and was still surrounded with the peculiar coloured ring. The child, meanwhile, though taking the breast greedily, had become much emaciated from sickness. Symptoms of the throat being affected now became manifest. It had difficulty in swallowing, crying when it attempted to suck, and slight swellings of the glands at the angles of the jaws became visible. A few days later, and the disease had extended to the larynx; the baby now had paroxysms of difficulty of breathing, a croupy cough with hoarseness; and on the day of its death, which took place one month after the appearance of the diphtheria, it was frequently convulsed. The mother made an excellent recovery from the confinement, and although she nursed the baby up to two days of its death, did not contract the disease.

Diphtheria, when it occurs sporadically, is not a very infectious disease, as these two cases show. Trousseau, in order to test its contagious nature, inoculated himself with the exudation, on the tonsils and velum, without any evil result; and M. Peter on three occasions inoculated himself on the lower lip, and rubbed his throat over with a mop charged with diphtheritic matter; also with a negative result. We know, however, that the disease has been communicated to the surgeon who, while performing tracheotomy, has sucked out blood, &c., from the air-passages by applying his lips to the wound; and of its infectious nature during an epidemic there is ample evidence.

The first case, besides the fact of the infant not taking the disease, is a remarkable one, inasmuch as the disease did not attack the uterine organs. It is the rule for diphtheria, once established in the body, to attack any abraded surface elsewhere, hence the great danger of applying a blister. Trousseau relates a case which contrasts well with these two, in which a lady, after a severe labour, was delivered by the forceps. A few days after, a diphtheritic patch appeared in the vagina, on a scratch caused by the instrument; it spread to the uterus, then manifested itself in the throat, and she died within a few days from what he calls "Diphtherite maligne." The infant also died on the same day, the disease having commenced in it, on an abrasion of the cheek, caused by the blade of the forceps. The following very interesting case, bearing on this part of the subject, occurred in the practice of my partner, Dr Willis.

CASE III.—A family of five children took the disease one after another; one dying. The mother, who had been unremitting in her attention to them, was confined just after their recovery. She escaped the disease entirely, but the baby was born with symptoms of it. Its skin had an icteric hue, and there was a discharge from its nostrils, which in a few days became copious, excoriating the upper lip, while at the same time it had fits of difficulty of breathing, with a croupy cough, showing that the larynx as well as the nostrils was attacked. It died in a paroxysm of difficulty of breathing twenty-one days after its birth. The mother up to this time had always borne fine, healthy children, but the next child, which was born a year after, was jaundiced at birth, and only lived a few weeks; the next died eight days after its birth from that curious form of jaundice accompanied with hæmorrhage from the umbilicus: she then had two miscarriages, then a puny baby which lived, and finally was delivered, about a year ago, of a large, healthy baby. Whether all these evils were due to her system having been poisoned with diphtheria without any local manifestation of it I cannot say, but I consider the facts worth recording.

Case IV.—A delicate girl, 12 years of age, had complained of a slight sore throat for about a week before I saw her. It had come on very gradually, there having been but little pain, no difficulty in swallowing, no feverishness; and her parents thought so little of the sore throat that they wished to consult me merely for the swelling of the glands at the right side of the neck, which had been enlarged for two or three days, and were daily getting larger. Her father was gardener and gate-keeper at a gentleman's house, and so slightly ill had she felt that she had attended to the gate as usual since the commencement of her illness, and actually opened it for me on my arrival. She looked very ill, evidently seriously ill, being very pale, and with the glands at the angle of the right jaw considerably swollen; the throat was of a livid colour, the right tonsil swollen and covered with a continuous diphtheritic exudation. This exudation was *strictly limited to the one tonsil*—not a speck was to be seen on any other part of the throat; the other tonsil had not been affected. There was no sickness, discharge, or cough, nor was the voice affected.

The tonsil was mopped over thoroughly and repeatedly at the one time, with a strong solution of nitrate of silver (ʒi. to ℥i. of water), taking care to remove as much as possible of the exudation, and a draught containing ten grains of chlorate of potash, and ten minims of tincture of the muriate of iron, ordered to be taken every 3 hours, and the throat to be gargled frequently with water acidulated with hydrochloric acid. Next day the tonsil was less swollen, the exudation less, and the general state of the patient encouraging. The solution of nitrate of silver was again applied with marked benefit, for the next day there was scarcely any exudation, and one more application caused its total disappearance, and with it all the throat symptoms. The patient, however, was still very pallid and weak, and so was ordered to continue taking the tincture of muriate of iron and chlorate of potash three times a day. She took it for ten days, and then feeling well, left it off.

This is a very good example of the mild form of *ordinary pharyngeal diphtheria.* The insidious commencement, the absence of febrile symptoms, the slight pain on deglutition, are all so different from ordinary tonsillitis, in which the pain is always severe, and the fever considerable; and then the pallor of the patient, the swelling of the submaxillary glands, and the continuous yellowish white exudation, rendered the diagnosis certain—though it is not common to see the exudation entirely limited to one tonsil. From the mild character of the disease and its easy cure, I had no reason to anticipate any serious sequelæ, but mark the further history of the case. Three weeks from the date of the commencement of her illness, symptoms of paralysis of the velum palati manifested themselves, and one week later they were fully developed. The voice had a nasal sound, and liquids when swallowed returned by the nostrils. She now staggered while walking, and complained of numbness of the feet. She was very thin and deadly pale. A fortnight later, she could not walk at all, and could scarcely stand without support. A slight cough now came on, accompanied with difficulty of breathing, which could not be accounted for by any disease in the lungs or heart. The difficulty of breathing daily increased; she lost the power of swallowing, and speech was so much affected as to be quite inarticulate, and finally she died from extension of the paralysis to the muscles of respiration, exactly seven weeks and two days from the commencement of the attack. This is a very rare termination of the paralysis following diphtheria, recovery being almost the invariable rule. At the time this case occurred, I was not aware of the efficacy of Faradization of the muscles in assisting in the cure, or I should most assuredly have given it a trial. In the case of a young gentleman, paralysed after diphtheria to such an extent as to be almost helpless, its effect was most marked and satisfactory. He made no progress towards recovery for months, until galvanism was applied to the muscles daily; he then recovered rapidly.

CASE V. is that of a little boy aged six years, in whom the disease was ushered in by incessant vomiting, and without any complaint being made of the throat, and it was only from observing, on the third day of his illness, the glands at the angles of the jaw swollen, that I was led to examine the throat. I found the tonsils, velum, and pharynx everywhere covered with diphtheritic exudation; the urine was highly albuminous. For eight days every drop of food or medicine was apparently immediately rejected, while the bowels were obstinately confined. This incessant vomiting generally indicates a very severe form of the disease, and is supposed to arise from an extension of the exudation down the œsophagus to the cardiac end of the stomach. Fortunately for our patient, it did not extend to the larynx,—its general course. At the end of the tenth day the stomach readily retained food, the albumen had disappeared from the urine and the exudation from the throat; in about a week more the little patient was up walking about, but very weak and anæmic. No local application of any sort was made to the throat, and the medicine given, which happened to be chlorate of potash and iodide of potassium, contributed nothing to his recovery as it was all rejected. A few days later,—three weeks from the first day of the attack,—paralysis of the velum came on, and shortly afterwards paralysis of the legs, so that he staggered about, but under the use of syrup of the phosphate of iron and small doses of strychnine, these passed off in the course of a month, though at the end of a year the patient was still very thin and anæmic.

The sanitary state of the house in which this patient and his mother lodged was very bad; the smell from the drains being perceptible. From this cause, and not from that of contagion, I imagine, two more cases occurred among the children of the landlady. These children had been kept entirely apart from the previous patient, and had never been even on the same storey. Their cases were interesting from the fact that the state of the throat in the youngest, a boy four years of age, differed in no perceptible degree from an ordinary sore throat, in which the tonsils are swollen, painful, and studded over with white spots of follicular secretion, and not a continuous exudation. At first I took his to be a simple sore throat, and it was only from the extreme pallor which remained for a couple of months afterwards, and from the fact of his sister, a fortnight later, manifesting a form of diphtheria, that I concluded it must have been that affection. The sister suffered severely from that form of diphtheria which attacks the jaws and cheeks, and which is so amenable to treatment by chlorate of potash. It is curious how this form of diphtheria,—for it is undoubtedly such,—should be so easily cured by chlorate of potash, while in its other forms it is scarcely if at all benefited by that drug.

Case VI. is one to which I wish to draw particular attention, illustrating, as it does in a remarkable manner, the proper treatment of diphtheria. It is a case of *cutaneous diphtheria*, occurring in a very stout woman aged 50. For many years a superficial sore had existed about the centre of her right leg, constantly discharging. One day she had a shivering fit, the leg became painful, and when I saw it three days later, was inflamed from the toes to the knee, swollen and tender to the touch, but not very painful when left alone, and with enormous blisters here and there over it. She had a severe cough, but otherwise was not suffering constitutionally. Pulse was unaffected, tongue slightly coated, and the appetite deficient—(I may here mention shortly, that throughout the illness the constitution did not sympathize with the disease, which remained entirely local.) At first I imagined it to be a severe case of erysipelas and treated it as such, but was struck with its peculiar colour, so different from the ordinary bright scarlet of that disease,—it was an intense dark violet crimson, something quite peculiar, and reminded me at once of the colour in Case II. Next day the blisters were almost continuous, two days later they had burst, and the leg from the knee downwards was covered with a diphtheritic exudation, exactly resembling chamois leather. Beyond the upper and lower margins of the exudation which ended in a sharp line, the skin for about an inch and a half maintained throughout the illness its intense peculiar angry red colour. The exudation could in places be lifted off, revealing below a raw, bleeding surface. A few hours sufficed for the exudation to be reproduced. It gave off an extremely fetid odour. I prescribed tincture of the muriate of iron in fifteen drop doses every four hours, and applied a lotion containing carbolic acid, glycerine, and water (strength, 1 to 40). This treatment was continued for a week without any beneficial result. The lotion causing a good deal of smarting, I substituted for it carron oil with a few drops of carbolic acid added, the odour being still very disagreeable,—first, however, applying a solution of nitrate of silver (20 grains to the ounce of water) all over the exudation. Four days later the swelling was slightly diminished, but there was no other improvement. She had been regularly taking the tincture of the muriate of iron up to this time, but feeling that it must be hopeless to attempt to cure the disease by this means, I omitted it and substituted quinine, to try to improve the appetite. I now rubbed over the exudation in one part, with solid sulphate of copper; in another, with a strong solution of nitrate of silver (40 grains to the ounce); and in a third, with carbolic acid and glycerine in equal parts. These were repeated every day in the same places for three days. They failed entirely to do any good that I could discover. Hydrochloric acid and water in equal parts was applied to another part. This also failed. I now thought that the reason why these caustics did no good was that the thick exudation formed a protective coating to the raw surface underneath, preventing their acting effectively on it. I therefore endeavoured to dissolve off the exudation first, by applying in one spot a strong solution of bicarbonate of soda; in another, a saturated solution of hyposulphite of soda; and in a third, equal parts of liquor potassæ and water. They had no effect whatever on the exudation; certainly none that could give rise to any hope that they might thus be useful in the throat affection. Failing to obtain any solvent action by chemical means, I next thoroughly rubbed off the exudation in a part to which nothing had yet been applied, coming down on the raw excoriated surface; to a part of this I applied solid nitrate of silver, and to the other part the same salt in solution (ʒi. to the ℥i.). Next day the membrane was reproduced. I rubbed it off again, and applied the nitrate of silver as before. Next day again it was reproduced. Again I rubbed it off and applied the caustics, and again next day it was reproduced. I then gave up all hope of doing good by local applications, and applied simple water dressing; but to my astonishment and delight, two or three days after, I found the membrane had spontaneously separated from this part—*i. e.*, the part to which I had applied the caustic solid and in solution, after rubbing off the exudation,—and that it was rapidly healing. It healed completely in a couple of days, while all the rest of the leg was still covered by exudation. I continued the water-dressing, and watched. It was some days before there was any improvement elsewhere, though the general state of the leg had been improving for some time, as evidenced by the diminished swelling and redness; the next part to get well was the part to which I had applied the strong solution of nitrate of silver without removing the false membrane, and this was well a considerable time before the parts to which any other caustic had been applied. The part to which the solid sulphate of copper had been applied was the last to get well, it continuing bad many days after the rest was healed. It is but fair, however, to state that the bluestone had been applied to the worst part of the leg, just over and around the original sore. The case was nine weeks under treatment from first to last. Nowhere had there been anything like ulceration of the true skin.

Having thus obtained positive proof of the utility of the local treatment when properly applied, *i.e.*, by first removing the exudation as completely as possible, and applying the caustic direct to the excoriated surface; I determined to do so thoroughly to the first case of diphtheritic throat affection that came under my care. Unfortunately the next three cases were in a hopeless state when I saw them. One was a little baby, in which, commencing in the vagina, it had spread into the groin, and had also appeared in the larynx, so that the child died of croup in a few hours after my seeing her. In the other two cases, commencing in the throat, it had advanced into the larynx, and they were nearly moribund at the time of my seeing them. In none of these was it tried, but

CASE VII. presenting itself, I gave it a fair trial. It was that of a girl aged 7. The disease commenced with incessant vomiting for three days, and slight feverish symptoms. No complaint of the throat was made, and it was only during retching that her mother happened to see the white appearance of the throat. On examination I found the tonsils swollen and covered with a thick diphtheritic exudation, and none visible on any other part. The glands at the angle of the jaw were swollen and tender; pulse 140, tongue slightly furred; says she has no pain in the throat, but there is manifestly difficulty in swallowing. A mixture containing chlorate of potash ʒi., iodide of potassium gr. vi., and infusion of bark ℥vi., of which a table-spoonful was to be taken every 4 hours, was ordered; the diphtheritic exudation was removed as carefully as possible with a mop, and a solution of nitrate of silver (ʒi. to the ℥i.) was applied. The mother was requested to mop out the throat very frequently with a solution containing tincture of the muriate of iron, ʒii. to water ℥vi., taking care to remove the exudation as completely as possible each time. This she did very efficiently, and next morning I was shewn two casts of the tonsils nearly a sixteenth of an inch thick, which she had succeeded in getting off shortly before my visit. The exudation had been reproduced within two hours of its removal by me on the previous day, and was now again present, though scarcely two hours had passed since its removal. It was again mopped off, the caustic solution applied, and the mother requested to continue mopping as she had been doing, while the patient was to gargle the throat frequently with the iron solution. The treatment was continued for four days before there was any marked improvement, but on the fourth day the exudation was present in but small quantity, and on the fifth there was no trace of it. During this time the patient had taken food freely, and was sometimes sick, but never complained of her throat. One day she had a croupy cough and was hoarse, and I was afraid the disease had extended to the larynx. She did actually cough up shreds of lymph as if from that part, but it had passed off by the following day. Five days after the disappearance of the exudation from the throat she had a smart dysenteric attack and passed what was apparently shreds of lymph. This disappeared in three days, but for three weeks more she was very pale, sick and feverish at times; then the velum became paralysed, giving rise to nasal voice and regurgitation of liquids through the nose, and the sight was affected, everything appearing double. Under the use of syrup of the phosphate of iron and strychnine these symptoms were cured in about three weeks more. I could give many more cases cured by means of the local treatment, but I must content myself with these.

Any one who has seen much of diphtheria must come to the conclusion that it is a disease which ought not to be treated by depletory measures. Of all the medicines recommended for internal administration, the only one I have the slightest faith in is the chlorate of potash and iodide of potassium mixture, but all my experience tends to prove that the best treatment is the local application of caustics *after carefully removing the false membrane.* To treat any disease successfully we must know how it tends to kill. Now putting aside those deaths which arise from its sequelae, such as sudden syncope, paralysis, &c., &c., diphtheria, during the acute stage, tends to kill in three ways. Firstly —The patients die in a few days fairly overwhelmed by the poison, the pharynx, larynx, and nostrils being all covered with false membranes. This is a rare form for which nothing can be done. Secondly—It may commence in the nostrils, and then it almost invariably kills, probably from absorption of poisonous matter through the spongy bones; or it may commence in the larynx, giving rise to true pseudo-membranous croup. Trousseau insists upon the fact that true croup is diphtheria, and though it sometimes commences in the larynx, that nineteen out of twenty times it commences in the pharynx, and it is only from its coming on so insidiously, and causing such slight symptoms until the larynx is affected, that this fact has been overlooked. Since I have been aware of his opinion on this point I have carefully examined the throat in four cases of genuine croup that have come under my care, and either found diphtheritic membrane actually present, or had a distinct history of premonitory symptoms of cold and slight sore throat. Thirdly—Commencing in the pharynx and generally on the tonsils, its tendency is to spread to the nostrils, and more commonly still to the larynx; in either case it is all but invariably fatal. This is the common form of the disease; and bearing in mind the fact that if we can keep the exudation confined to the pharynx the patient will be in little danger, we have at once before us the great principle of treatment. This end is not to be attained by any constitutional remedy. If medicine could cure the disease, it would do so no matter where the disease was situated, and every one knows that medicine produces no effect on nasal, laryngeal, or cutaneous diphtheria. There is not the slightest doubt but that chlorate of potash will cure buccal diphtheria, which is a curious form of the disease, apparently having the same relation to diphtheria as epithelioma has to cancer. This is the only reason why I give the preference to that drug over others, feeling that if it is of use in one form, it ought to be so in another, but I cannot say that I have seen any good from it. It is to the local application of caustics that one must trust, and that this may be done hopefully Case VI. shews.

English physicians, as a rule, say local means are of no use, that the disease is a constitutional one, and must be treated by constitutional means; but they forget that the disease kills in the acute stage by its local manifestation; that death is due to invasion of the larynx by the extension of the exudation from the throat,—and the whole question of treatment is how to prevent this. The experience of French physicians is entirely in favour of local means. Trousseau relates that in his early days, *every* case of diphtheria that he treated died; but that he came to hear of cures being affected by an old woman, and on investigation found that she actually did cure the disease, and she did so by the vigorous and repeated application of alum in vinegar. This plan Trousseau tried, and thanks to the local treatment thus inaugurated, he and others began to save cases. Here is an example. Having heard that a neighbouring village was being ravaged by the disease he went there, and on a farm he found only the master and a female servant aged sixteen years:—"The man was seated in the corner of the fireplace, and did not rise to receive me. He was twenty-seven years old. He related to me that he and the young woman near him were the only ones surviving out of seventeen persons belonging to his house and farm. The young woman had had the disease; but she had been saved by the curé, who had touched her throat eight or ten times with hydrochloric acid. As for him, he knew the fate which was reserved for him. 'To-morrow, or after,' he said, 'I shall be dead, as are dead my children, my wife, my father, and my mother.' In his fatalism he awaited the event, without wishing to do anything to avoid it. I, however, examined his throat; the tonsils were completely covered with pseudo-membranous concretions; the state of the respiration and voice shewed me that the larynx was not yet invaded. I endeavoured to inspire him with hope, and offering to him as an example the young woman who was with him, I said all was not yet lost, that he might be cured in consenting to be treated as she had been. He was persuaded, and, God aiding, my applications had the hoped-for result. The man was saved. Left to itself, this disease is almost fatally mortal."

When a case of diphtheria in which the larynx is not yet implicated comes under the care of any one who reads this, while administering any medicine that he has faith in, and supporting the constitutional powers, let me urge upon him to *remove the exudation as thoroughly as possible, apply a strong caustic*, and to do so at least once daily,—and in the intervals to order the throat to be mopped out frequently with sulphurous acid, chloride of soda solution, or any other disinfecting or mild caustic solution. Tannic acid or alum blown into the throat is recommended by Trousseau.

A word in conclusion about the diagnosis of diphtheria. I not unfrequently hear of some one having treated a large number of cases of diphtheria by some medicine such as chlorine water, &c., and never having had a death; but on investigating the cases I find that they were not cases of diphtheria, but of ordinary tonsillitis with follicular secretions. No case should be considered one of diphtheria unless the exudation is *continuous*, and the glands at the angles of the jaws *visibly* enlarged. There must be both of these, one without the other is not sufficient; and the history of a case of diphtheria cured by any means, without a statement that both of these were present, is of absolutely no value. Sometimes, but very rarely, these symptoms are absent in very mild cases, but then the nature of the disease is cleared up by some of its sequelæ. The cases given by Dr Dewar in his pamphlet "On the application of Sulphurous Acid, &c.," are thus of no value; the only case which, from his description, there is no doubt was diphtheria, died; and the case entitled "A Fight with Diphtheria," in Mr Pairman's pamphlet, cured by means of sulphur fumes, &c., described as having "a large slough on each tonsil, fœtid breath, foul tongue, hacking of phlegm, hot skin, feverish pulse, &c.," may or may not have been diphtheria; the above description is certainly not that of diphtheria, and hence this case also is of no value. I do not wish any one, however, to think from this that I do not consider sulphurous acid useful in this disease,—on the contrary, it is of great use as a deodorant and disinfectant when applied frequently to the throat.

IV.—SYPHILISATION IN CHRISTIANIA.

By M. Charteris, M.D., *Physician, Glasgow Royal Infirmary Dispensary; and Assistant-Surgeon, Glasgow Eye Infirmary.*

"Je ferai le vœu en terminant, que la syphilisation soit etudie avec tranquillité et avec exactitude," says Professor Boeck, of Christiania, in concluding his remarks on the method of treatment of syphilis. Having been at Christiania lately, and having had opportunities of observing in the syphilitic wards this treatment, I have thought that probably a few remarks on it might not be uninteresting to readers of the *Glasgow Medical Journal.*

Professor Boeck was in America, but Mr Bidenkap, who had charge of the wards, and who has also written most ably on the subject, was very kind and attentive. Upwards of twenty cases were undergoing syphilisation. The principles of the treatment are now well known, yet a few of the details of the process may not be out of place.

With the matter of a true syphilitic chancre, or of one artificially produced, three small punctures are made with a lancet on each side of the breast of the patient. On the third day the small pustules developed in consequence are opened, and three more punctures are made about half-an-inch below the original sites. These again on the third day are similarly dealt with, and the same number of punctures are made below them at the same distance. Having thus operated on both sides to the groin, the inoculation is now taken to the shoulder and carried by successive steps every third day to the arm. From the arm the matter is taken to the leg, and in a similar manner brought to the knee. In their progress on the leg, or in some cases sooner, the pustules begin to lose their original form. They become smaller and drier—at last they cease to yield matter, and that state is reached, which is called by M. Auzias-Turenne, "Syphilisation."

I was under the impression, from reading on the question, that this treatment was intrinsically revolting. This is not the case; acute inflammation in the artificial chancres is not seen; they are similar in size and shape to small soft boils, with no hard or extensive bases. They do not seem to give much uneasiness locally, and they certainly do not influence the general health. In none of the cases was there the slightest emaciation, and it was impossible to judge from the face and physique of the patient that any treatment such as has been indicated was being carried on. Rest and confinement in the house are not necessary. In proof of this I may mention that Mr Bidenkap has at present some gentlemen under treatment, who are also attending their usual avocations. As in this country we hesitate to give mercury until the secondary rash has appeared, so inoculation, on a similar principle, is never begun until constitutional symptoms are well marked. Patients are sometimes kept in the hospital for weeks without anything being done, lest a mistake might be made in this important point. In several of the cases iritis was present, and was treated solely by the instillation of atropine in the proportion of two grains to the ounce applied three or four times daily. In none of the cases so treated was there the slightest irregularity or distortion of the pupil. This to me appeared a most convincing proof that the effects of syphilisation are not merely derivative, but exert a peculiar influence on the constitution.

It would be presumptuous in me, from the short time I had of studying the treatment, to give any very definite opinion on its merits. No sufficient explanation has been as yet given of how the curative process is effected, but this "must not shut our eyes," as Mr Coulson remarks, "to the conclusions derived from actual practice." We cannot explain how vaccination acts, but we are not the less sure that by its adoption we can prevent small-pox. Since 1185 syphilisation has been carried on at Christiania not merely as an interesting problem, but primarily for the cure of the patient; and according to the testimony of those best qualified to judge from long experience and patient investigation, it has been attended with most satisfactory results. A cure is accomplished in from three to four months, and this cure is enhanced by its preventing tertiary symptoms, and ulterior bad effects on the constitution. It has also the advantage of allowing no relapse of the disease, and preventing hereditary syphilis. On this last point, in my opinion, the whole question of syphilisation turns. Syphilisation, according even to Messrs. Lane and Gascoyen, in their experiments on the subject at the Lock Hospital, London, in no way affects the general health, and my own observations enable me to testify the same result in Norway. Granting this then, and granting that it cures the disease and prevents hereditary syphilis, it would ill become us to ridicule the treatment, because at first sight it is repugnant to our feelings, and because we are unable theoretically to explain the modus operandi. Hereditary syphilis destroys the peace of many a home; if statistics show that this can be averted, I think we are bound to give syphilisation a more extended trial than has as yet been done in this country.

The principal objection to its adoption as a line of practice is the social stigma which it involves—the cicatrices left on the seat of the ulcers are permanent. To the pure all things are pure, but the knowledge of good and evil (supposing the syphilised man married afterwards) would become apparent to one to whom he is bound by the holiest of all ties. Like the D that brands the deserter from the army, he would be liable at any unforeseen moment to have the fact that he was an Ishmaelite in the moral camp made patent to his family circle—ante-nuptial relations would be known to those, from whom, above all others, he would desire to keep them secret.

V.—ON EPIDEMIC SCARLET FEVER.

By David Easton, B.A., M.D., *Stranraer.*

(Concluded from page 364.)

Treatment of Malignant Forms.—It is the malignant forms of the fever, however, that put to the test the efficacy of our treatment. While the general management is the same, the treatment of special symptoms becomes more important. But, once for all, we enjoin the practitioner never, in the treatment of special symptoms, to forget that the strength of the patient must be maintained, and with this presumption all our subsequent directions must be taken.

Vomiting.—The vomiting which so frequently ushers in the fever will, as a rule, stop spontaneously without any medical treatment. When the ejecta are dark, bilious, and offensive, emesis should be promoted by copious draughts of lukewarm water, and, if necessary, by sulphate of zinc. The vomiting will then most likely subside; but, if it should continue, and be accompanied by great prostration, spiritus chloroformi, with tincture of hyosciamus and a small proportion of hydrocyanic acid, suited to the age of the patient, or brandy and water with citrate of potash, may be administered. Small pieces of ice may at the same time be chewed and swallowed. Chloroform and camphor liniment, applied to the stomach, and covered with wadding and oiled silk, may likewise be used.

Diarrhœa.—Diarrhœa, like the vomiting, is in some cases merely an effort of nature to get rid of the noxious matters from the bowels, and ought not to be at once checked, but merely modified, so as not unduly to prostrate the system. When the evacuations are unnatural and offensive, the following powder, suited to a child three years of age, may be given and repeated if found necessary:—

℞. Pulv. Rhei.
Sodæ Bicarb., aa, - - - grii.
Hydrarg. c. Creta - - - gri. M.

When the diarrhœa is excessive, and accompanied by great prostration, fluid bismuth (Schacht's) may be given frequently in brandy and water. If it is necessary to calm the system, and use a more powerful astringent, a few drops of Battley's solution may be advantageously combined. The diarrhœa and the vomiting may, however, be the direct consequence of the poisoning of the whole vital system. Our main efforts should then be directed not so much to the checking and modifying of these symptoms as to the supporting and rousing of the vital powers which are necessarily low.

Suppressed rash.—When the rash is but imperfectly developed, or is in some way suppressed, or when it suddenly recedes or changes its character, the body of the patient should be at once enveloped in a small blanket wrung out of hot water and mustard, and then covered over with a dry one. This application ought to be continued for at least half-an-hour. Immediately on its removal the body should be wiped dry with soft warm towels, and then wrapped again in warm blankets, and bottles filled with hot water should be applied to the feet and to the thighs so as to prevent the body from cooling. This treatment will frequently succeed in developing the rash more fully, and in restoring it to a more normal condition, and in some measure in lessening the severity of the constitutional symptoms. The following mixture forms a valuable adjuvant to these applications.

℞	Liq. Ammon. Acet. - - -		
	Spt. Etheris Nit., aa. - - -	℥i.	
	Liq. Ammon. Carb. - - -	ʒv.	
	Syrup. Aurantii - - - -	ʒvi.	M.

A teaspoonful in a tablespoonful of water may be given to a child three or four years of age, every two hours, until the change has taken place in the rash. The mixture may be then given at longer intervals so long as its diaphoretic and diuretic effects are wished. The nature of the case will indicate whether other stimulants ought also to be given.

Throat Complications.—The general directions already given equally apply here. The throat should in all cases be enveloped in warm poultices, rendered soft with warm olive oil, or in carded cotton saturated with warm oil, and the whole should be covered over with warm soft flannel or a sheet of wadding. If these applications be properly made, so as thoroughly to exclude the cold external air, it will be sufficient to have them changed morning and evening, but they ought never to be allowed to get in the slightest degree cold. The practice of leeching and blistering the throat I consider injurious, and therefore do not adopt it. I have formed the same opinion as to making incisions into the glandular swellings, except for the purpose of evacuating the contents of an abcess after it has approached near to the surface; and the incisions ought then to be only sufficiently large to allow the pus to escape. It is easy to pull down the strength, but difficult to build it up again. It is easy to break the continuity of surface, but it is not an easy matter sometimes to heal the sore we have made. It is a mistake to suppose that early incisions into the swollen glands, especially of young children, will arrest the inflammation and the farther enlargement of the glands and neighbouring tissues; on the contrary, they will not only fail to do so, but they prevent resolution or suppuration from taking place, and either result is infinitely to be preferred to the unhealthy sores caused by the incisions, which prostrate the patient by discharge. On the other hand, if late incisions are made into the swelling with the object of preventing or arresting sloughing, the result will be the opposite of what was intended, and the patient's life will be endangered. When sloughing of the glands or of the integuments of the neck has taken place, the sores ought to be bathed morning and evening with a weak solution of nitrate of silver, four grains to the ounce of distilled water; or with Condy's fluid, *full strength*; or with a solution of carbolic acid, ten or twenty grains to the ounce of water. After each application of one or other of these solutions, the whole throat should be completely enveloped in carded cotton, thoroughly saturated with olive oil and carbolic acid —ten parts of the former to one part of the latter. I have not found it necessary to increase the strength of these applications. The spread of the sloughing is soon arrested, and the sores in a short time put on a healthy aspect under their use; but, as the healing process advances, the topical remedies ought to be made gradually weaker. When the throat is ulcerated, the nitrate of silver in solution—thirty grains to the ounce of distilled water—may with great benefit be applied to the ulcers with a hair pencil, or, what is better, a sponge probang. I prefer the solution to the solid caustic. Its strength may be increased according to the requirements of the case; it is more easily and more quickly applied, and that is of some importance in treating children; and besides, when the ulcers extend over a large surface, they are more likely to be all touched with the probang than a caustic pencil. When the tonsils and fauces are only reddened and congested, the same application will be of great use in reducing the inflammation, &c. As the disease advances, however, it is often impossible to get a view of these parts, on account of the great swelling of the throat, and the inability of the patient to open his mouth. When that is the case, the best treatment is to inject through the nostrils a weak solution of nitrate of silver—one grain to the ounce of distilled water; or a solution of chlorate of potash—twenty grains to the ounce of water; or chlorine water. These injections may be repeated three or four times daily, according to the nature of the case. They clear the nasal passages and throat of the sanious discharge, for the greater portion of the solution returns by the mouth and nose, carrying with it that discharge, and they relieve the breathing, and otherwise act beneficially upon the ulcers. When the discharge is very copious and offensive, a solution of carbolic acid—three grains to the ounce of water —may be injected into the nostrils with good effect. The portion of the solution that might pass down the throat may in some measure counteract the evil effects which the sanious discharge, when swallowed, is apt to produce upon the stomach and bowels. I have never seen any harm resulting from this mode of treating the throat affection; but I have seen many patients, when gasping for breath from the blocking up of the air passages by the discharge, speedily and even permanently relieved by these nasal injections. I have sometimes, with beneficial results, applied to the throat the spray of sulphurous acid; but, in other instances, the annoyance the application gave, and the resistance it provoked, more than counterbalanced any good that it might otherwise have accomplished. When sloughing of the tonsils or fauces takes place to any extent, or when true diphtheric patches appear, which can be easily seen and reached, equal parts of honey and muriatic acid may be applied to the sloughs with a hair pencil with good effect, or the tincture of steel, made with rectified spirit, may be used instead. When these strong applications are used they must not be repeated oftener than once in the two days, except in rare instances. The application of these local remedies should not be left to mothers or nurses, but ought to be made by the medical attendant himself. It must be remembered that the sanious discharge, when very copious, adds greatly to the general depression, and to the fearful asthenic symptoms which frequently carry off the patient; and further, that when swallowed in great quantities, it is in part re-absorbed, and, by its poisonous influence, increases the depression. To prevent, as far as possible, these consequences, an emetic of sulphate of zinc might be of service in expelling the discharges, and thus relieving the stomach of their presence. Caution, however, is necessary in selecting proper patients for this treatment. The child ought to be sufficiently strong to bear the emetic, and able to drink a sufficient quantity of fluids, in order to facilitate the vomiting. Every effort should be made, at the same time, to support the patient's strength, by the frequent and liberal administration of the stronger stimulants.

Hydrochloric acid, largely diluted with water and slightly sweetened with syrup of orange-peel, forms an agreeable mixture and is readily taken, and has often proved of great benefit in cleaning the tongue and throat. Small pieces of ice may be frequently given. Ice cools the mouth, quenches the thirst, acts beneficially upon the inflamed and enlarged tonsils and fauces, and, when it is swallowed in very small pieces, it is one of the best remedies for irritability of the stomach. As already remarked, much dependence, especially in the case of young children, cannot be placed in gargles; our chief reliance must be placed in the local remedies just noticed. When gargles are used they ought to be composed of the simplest ingredients, so that, if swallowed, they may not produce any injurious effect. The following gargle suits very well: it is pleasant to the taste, and is readily taken:—

℞ Mist. Acaciæ,	℥vii.
Acid. Muriat.,	ʒi.
Syrup. Aurantii,	ʒvii. M.

A dessert spoonful may be added to as much warm water, and used frequently as a gargle, or it may be given in cold water as a drink. The acid may be increased or diminished according to circumstances.

Delirium.—The delirium, it must be remembered, is due to the fever poison acting through the blood upon the brain. It is not the result of inflammation or congestion of that organ. The exceptions to this are very rare indeed. The delirium ought not, therefore, to be treated merely as a symptom apart from the fever poison, but with the full knowledge of the powerfully depressing effect that poison exerts upon the nervous system and upon the whole vital forces. All lowering or depressing measures must therefore be avoided. When the fever is likely to assume a serious form, it is well to have the head shaved, even before there is any great disturbance of the nervous system. When the delirium is accompanied with a very hot head, then cold evaporating lotions, iced water, or a bladder filled with small chips of ice, are the applications most to be relied upon; but these must not be carried too far. The patient, it is to be remembered, is easily depressed. The pulse ought to be carefully watched, and the general prostration judged of by its rapidity.

The only form of delirium in which antiphlogistic remedies are indicated is that in which the head is hot, but the pulse slow and full. In such cases leeches may be applied with great benefit to the temples. The local depletion may be followed up by cold lotions. Should this fail in restoring intelligence and inducing sleep, from two to eight drops of liq. opii. sedat. (Battley's), according to age, combined, if the pulse still continues firm, with a few drops of vinum antimonii in a drachm of syrup and water, may be given. When the pulse is tolerably slow, but not full, and when the head is cool, the mixture alone may be given, and in the majority of cases it will succeed in inducing calm and refreshing sleep. The little patient awakes quite intelligent. The mixture may be repeated in three or four hours, should the patient still continue sleepless. A little sleep may turn the scale in favour of the patient. Much of the delirium and restlessness is due to nervous excitement, and the best remedy for it is the opium. When the pulse is very rapid and small, Battley's solution may be combined with chloric æther and water or brandy and water. The opium will have a more decided effect if the bowels have been previously well moved, and are at the time regular.

Convulsions.—Convulsions in the malignant types of the disease are not of very rare occurrence. When they take place suddenly and early in the fever, they are apt to be attributed to cerebral congestion alone, or some kindred affection, and treated accordingly; while, with few exceptions, the poisoned condition of the blood and not congestion or inflammation of the brain is the main cause of these convulsions. Depletion may sometimes partially relieve the urgent symptoms, but it is certain to induce such a degree of vital prostration as to leave the patient even still more at the mercy of the poison. The convulsions soon return with more force, and rapidly merge into drowsiness and coma. This is more likely to take place if the pulse during the time of the convulsions be exceedingly rapid and small, and if the other symptoms point to the malignancy of the fever. The hair should at once be taken off, and the head kept constantly wet with cold lotions; or ice, according to circumstances, may be applied. The limbs.

at the same time, may be wrapped in hot mustard fomentations. When the pulse is very rapid and weak this treatment is most to be relied upon. Should the rash be suppressed or imperfectly developed, it should be restored to its normal state as soon as possible. There is nothing that will more readily give rise to convulsions, especially in young children, than an accumulation of any irritating matter in the stomach and bowels. If such accumulations are present, the sooner they are cleared out of the system the better. An emetic may for this purpose be cautiously administered, followed by a simple aperient; the condition of the patient's strength should, at the same time, be carefully watched. Convulsions occasionally take place later in the disease, owing to great enlargement and suppuration of the glands of the neck. These convulsions, however, will soon disappear after the accumulated pus has been evacuated, and after the subsidence of the glandular enlargements. Stimulants ought to be given very liberally in these cases also. In rare cases the convulsions may be due to cerebral congestion. The pulse will then be found to be strong and by no means rapid. There will also be present some of the more characteristic symptoms of congestion. When this is the cause a few leeches applied to the temples will be of benefit. This is to be followed by cold affusion on the head. When the convulsions arise from the poisoned state of the blood, the treatment should be mainly directed to the elimination of that poison through some of the emunctories. To that we have already referred. The force of the respiratory and circulating systems ought if possible to be maintained, for it is only by so doing that the process of elimination will be kept up.

Coma.—When coma has set in, the chances of recovery are very small, and little can be done. Cold affusion modified according to the heat of the head and the strength of the patient, when judiciously and carefully applied on the head, previously shaved, may be of some benefit. A mustard poultice to the nape of the neck, with similar applications to the feet, and, if the pulse be rapid and weak, to the cardiac region also, may be tried next. Should these fail in arousing the patient, a large blister may be applied to the head.

Croup.—On the first change of the voice showing itself, a succession of large sponges, or pieces of flannel cloth, should be wrung out of hot water, applied along the course of the larynx, the trachea, and to the upper part of the chest, and repeated every two or three minutes for about half-an-hour, then they may be covered over with dry flannel or wadding and allowed to remain, while an emetic of sulphate of zinc may be given. The patient's strength should be carefully observed, and the strongest stimulants given if necessary. This treatment is most to be relied upon in meeting these symptoms. It is speediest in its action, and most efficacious in its results.

Rheumatism.—The rheumatic pains which so frequently accompany the fever, are connected with, and have their origin in the poisoned condition of the blood, and will therefore be most successfully treated by promoting the natural secretions. The following mixture I have found of great value; a dessert-spoonful of it, in an equal proportion of water, may be given to a child about six years of age, three times daily:—

℞. Vin. Colchici,
Iodid. Potassii,
Acet. Potassæ aa, - - - ʒi.
Liq. Opii Sed. (Battley), - - ʒss.
Aquæ ad - - - - - ℥iv. M.

Battley's solution may be increased or diminished according to the degree of restlessness and susceptibility of the patient. The affected joints may be, at the same time, enveloped in flannel cloths wrung out of a hot decoction of poppy heads, and covered over with impervious cloth. This treatment invariably succeeds in relieving the painful symptoms, and in inducing general quietness of the system.

Food.—The diet, if properly attended to, forms one of the most important parts of treatment. It must be borne in mind that the digestive organs are much impaired, and that they are to a great extent unable to assimilate even the ordinary kinds of food; and that food undigested not only does no good, but does positive injury. From the very commencement of the fever solid food should be withheld from the patient. In the early stage, when the tongue is moist, animal soups, slightly thickened with arrowroot or some other farinaceous substance, or barley gruel, to which may be added a few spoonfuls of beef tea, will suit well; or chicken jelly, made by boiling a chicken to shreds in a sufficient quantity of water, containing a tablespoonful of barley, and the whole filtered through a thin cloth to separate the insoluble parts—the decoction being then set aside to cool, when it becomes a jelly. This is readily taken, easily digested, and is very nutritious; or it may be given when hot, as a soup, according to taste. When the tongue becomes dry and brown, strong animal soups alone should be given, frequently and in small quantities, so as not to load the stomach, and yet so as to impart sufficient nourishment.

When the patient is unable to swallow, strong soups and stimulants may be injected into the stomach through a small tube passed through one of the nostrils in the manner described by Dr Tennent in a recent number of the *Glasgow Medical Journal.*

Stimulants.—There is scarcely a period during the progress of the malignant types of the disease wherein the adoption of stimulants in some form or other is not indicated. The amount and kind of stimulant required will vary according to the severity of the fever, and the age and constitution of the patient. It is better that the stimulants be administered too soon, than that they be withheld until exhaustion has set in. When the delirium is the result of the imperfect purifying of the blood, which is usually the case, stimulants are clearly demanded for the purpose of promoting a more vigorous action of the heart and lungs so as to facilitate the process of elimination of the poison.

In those cases again where there are extensive sloughing of the glands of the neck and other serious throat complications, and exhausting discharges and sudden changes in the appearance of the eruption, and also when the pulse is very rapid and weak, the stronger stimulants ought to be given, such as brandy, carbonate of ammonia, æther and wine. In some cases the specific poison seems to exert a peculiar influence upon the action of the heart, which becomes extremely rapid, or unusually slow and very feeble. Stimulants in both cases are required.

Remedies.—There are no specifics or remedies properly so called. Quinine is a remedy of great value, but is very apt to disagree with the patient, unless the digestive organs have been previously regulated. The dose will vary according to the age and strength of the patient, and also according to the severity of the disease. From one to three grains dissolved in a little water, with two drops of sulphuric acid may be given to a child six years old, three times daily. To render the mixture more palatable, a drachm of syrup of ginger may be added to each dose. This remedy is peculiarly suitable when the throat affection predominates. It is to be increased in proportion to the severity of the throat symptoms. When diphtheric symptoms are present, each dose of the quinine may be dissolved with from ten to thirty drops of the tincture of steel, instead of with the acid. This is suited also when there is a tendency to purpura or passive hæmorrhage. When the bowels have a tendency to remain confined, a laxative may, with the best results, be combined with a tonic. The following I have found to suit well in the proportion of a tablespoonful three times daily to a child six years of age:—

℞. Quiniæ Sulph.	
Ferri Sulph. aa, - - -	gr. xvi.
Magnesiæ Sulph. - - -	ʒij-ʒiv.
Acid. Sulph. dil. - - -	gtt. xx.
Aquæ Cinnam. ad, - -	℥viii. M.

Convalescence.—The duties of the physician do not terminate with the fever. The period of convalescence is of much importance, requiring the superintendence of the physician, as well as the careful attention of the nurse. Serious consequences have often occurred to the patient from slight exposure to cold, or some error in diet, or undue excitement, or over fatigue, which might have been prevented by the use of simple precautions. The patient's whole system may be very much prostrated. In these circumstances tonics are clearly indicated. The food should be simple, nourishing, and of a very digestible kind. The transition from fluids to solids ought to be very gradual. It is of the highest importance that the patient be confined to the house for some time after convalescence, no matter how mild the attack has been; and on no account is he to be exposed to the chilling influence of a cold and damp atmosphere. Previous to his being allowed to go out, his body should be rubbed over with olive oil on two or three occasions, and there should be a warm bath the day after. The clothing should be sufficient, free from the slightest trace of damp, and of the warmest material. When orders such as these have been carried out, and when the skin is natural, and convalescence is established, the patient may be permitted to go out for a short time during the warmest part of the day.

Scarlatinal Dropsy is of frequent occurrence after mild forms of the fever, for the obvious reason that the exciting cause of this sequela is frequently disregarded after a mild attack. The mortality from this cause amongst the children of the poor was greater than from the fever itself, except during the period of its greatest malignancy, because medical advice was frequently not sought until the disease had advanced beyond the power of remedies. The dropsy was usually the result of insufficient clothing, unsuitable diet, or exposure to cold and damp. But it may occur in spite of every precaution, showing that a guarded prognosis ought to be given until the time in which it generally appears has passed.

At whatever stage of the fever the dropsy appeared, its approach was invariably indicated by premonitory symptoms. When, during convalescence, or at a more remote period, the patient's appetite begins to fail, or the patient becomes easily annoyed and restless, attention should be directed to the state of the urine, for it will frequently point out that condition of the kidneys which invariably precedes the anasarca. The scantier and the darker the urine is, and the more loaded it becomes with albumen, the greater is the renal congestion. A sudden acceleration of the pulse, without any apparent cause, ought also to direct attention to the kidneys as the seat of mischief. Sometimes the pulse was unusually slow and weak—much weaker than could be accounted for by the general prostration; at other times the heart's impulse was much stronger than was indicated by the pulse. These symptoms were apt to be followed by cerebral as well as renal complications. The severity of the pending dropsy could always be determined by the existing condition of the various organs. The greater their activity the less will be the renal congestion, the less will the blood be charged with urea, and, in all likelihood, the less severe will the dropsical effusion turn out to be, and *vice versa.*

The swelling was very characteristic. The features early assumed a pale anæmic puffy aspect, owing to the diminished amount of the red corpuscles of the blood and to its general poverty. The œdema first appeared under the eyes, on the dorsum of the feet, or on the backs of the hands, the other parts of the body becoming sometimes gradually involved. In rare cases the serum became effused into the thoracic and abdominal cavities, as well as into the brain itself.

Treatment of Dropsy.—In the early stage it was directed first to relieving the oppressed kidneys. When the congestion was acute—indicated by the condition of the urine, the high temperature of the skin, the quick pulse, and uneasiness in the lumbar regions—and when the patient had not suffered severely from the fever, cautious depletion by cupping or leeches, followed by warm bran poultices, or hot fomentations over the kidneys, was of great benefit; then a purgative was administered with good effect. The cases demanding local depletion were of rare occurrence. The action of the skin was then promoted. This was best accomplished by a vapour bath, or by enveloping the lower half of the body in hot fomentations. During this treatment the head should be kept cool. The following mixture was then prescribed:—

℞. Liq. Ammon. Acet. - - -	℥ij.
Vini Antimon. - - - -	ʒss-ʒj.
Acet. Potass. - - - -	ʒij.
Mist. Camph. ad. - - - -	℥iv. M.

Give from one to three teaspoonfuls every three hours till a sufficient effect is produced. The ordinary warm bath could not be depended upon, and it ought not to be given when the nervous system is materially involved. The removal of the dropsical effusion next demanded attention. Remedies that had a more direct action upon the kidneys were administered, such as the acetate and carbonate of potash, with tinct. digitalis, or sweet nitre with spt. junip., tinct. scillæ., and mist. camph. Purgatives were invaluable. Tonics with iodid. potass. were given after albumen had disappeared from the urine. When the patient had passed through a severe form of the fever, and was much prostrated, fomentations, dry cupping, laxatives, diuretics more or less stimulating, and chalybeate tonics, were the chief remedies adopted.

Sometimes the dropsy seemed to be the result not so much of renal congestion as of the deficiency of fibrine in the blood, and of the extreme general debility. The features had a very blanched and anæmic appearance; the pulse was usually very weak and quick; in rare cases it was unusually slow. There was then a special tendency to passive congestion of lungs and other dangerous complications. The most efficacious as well as the best preventative remedies were steel and quinine in full doses, or quinine with sulphuric acid and some bitter infusion.

Cerebral Symptoms in Dropsy.—When acute and sudden in their appearance, and when accompanied by a quick and full pulse; or, when the pulse was apparently weak, but the heart's impulse strong, the application of leeches to the temples, followed by cold lotions, was of much benefit.

Counter irritants were applied to the nape when anything like stupor appeared. Strong purgatives were invaluable. Cold lotions were sufficient in less acute forms. Stimulants and chalybeates were administered with the best results when there was extreme prostration of the vital forces.

J. G., aged 10, three weeks convalescent from a mild attack, was suddenly seized in the evening with violent convulsions, recurring every few minutes, and implicating the whole body and muscles of the face. Face was swollen; pulse 50, and apparently weak; heart labouring, and its impulse strong; head hot. Eight leeches were at once applied to the temples; the head was then shaved, and cold evaporating lotions applied to it; a hot bran poultice was ordered to the kidneys. In less than an hour the convulsions had ceased, and the patient had fallen asleep. The pulse was now 70, and soft, and the heart's action calmer. On the following morning he was quite intelligent; pulse 76, and soft; head cool; urine scanty, dark, and loaded with albumen. To have a smart purgative, afterwards a diaphoretic combined with a diuretic; bran poultice to be continued to kidneys. The progress of the case was rapid and satisfactory.

These observations on scarlet fever I beg to lay before my brother practitioners, in the hope that they will be acceptable. I am sorry I have been unable to put them into fewer words. In preparing this paper I have kept in mind the probable desiderata of the medical student about to enter on the practice of his profession. I trust I may be permitted to hope that this record of my professional experience will avail as an aid in the work of alleviating the pain and lessening the danger of a dreadful malady.

VI.—NOTES OF EXPERIMENTS WITH THE BARK, LEAVES, FLOWERS, YOUNG PODS, AND SEEDS OF CYTISUS LABURNUM.

By JOHN DOUGALL, M.B., C.M., Glasgow.

THE Laburnum, or Pea Tree, is a well-known ornamental plant, and is conspicuous about the month of June by its profusion of yellow pendulous racemes. Almost every summer and autumn cases are reported of children being accidentally poisoned by eating portions of this tree, generally said to be the flowering twigs.

From the experiments of Dr Christison, there can be no doubt that an energetic poisonous principle (cytisine) resides in the laburnum bark to a high degree, and although the leaves, flowers, seeds, and young pods of the plant are also popularly considered poisonous, still, according to Taylor,* no experiments have been performed with them. It seemed to me, therefore, possible that the few cases recorded of poisoning by these, may have been caused by portions of the bark being swallowed at the same time.

To ascertain whether the seeds, flowers, leaves, and young pods are separately or at all poisonous, I made the following experiments, including also the bark :—

I. From several trees in flower was collected a quantity of pods of the previous year's growth, which were still attached to the branches. The greater number of these had dehisced, and shed about half their seeds. 160 of these seeds weighed ʒi. Allowing an average of 8 seeds to each pod, ʒi. of seeds will represent 20 pods. ʒii. were bruised, *i.e.*, 320 seeds, or the contents of 40 pods, the flour mixed with water, so as to form a doughy mass, and a domesticated rabbit made to swallow about two thirds of the whole. The animal was carefully watched for two hours after, without any untoward symptoms being observed; latterly it was left for the night in a small room, with the remainder of the dough lying on a saucer. Next morning it was alive and healthy, while the dough had disappeared. There can be no doubt that it was eaten by the rabbit, as there were no vermin in the room.

II. A similar quantity of the same seeds was bruised, ʒvi. proof spirit added, and set aside to macerate. Three days after, the mixture was strained, and the residue washed with spirit. The tincture thus obtained was of a light yellowish colour, with a tinge of green, and measured with the washings about ʒvi. It was set aside for a few days to allow the spirit to evaporate, and latterly it yielded about ʒi. of a greenish-yellow fluid, syrupy in consistence, but without viscidity; to this was added water ʒii., and on stirring the mixture it was seen to be composed of a greenish flakey sediment, suspended in an almost colourless fluid, —in other words, the concentrated residue was insoluble in water. The rabbit previously experimented on having been secured, the mixture was carefully poured in small portions down its throat till the whole had been given, except about ʒss., which was accidentally lost. It was then carefully watched for some hours without the least appearance of abnormal symptoms being observed.

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* *On Poisons*, page 841, edit. 1859.

The writer masticated and swallowed 25 of the mature dried seeds on an empty stomach. Their taste did not appear to be nauseous and bitter, as mentioned by Christison, unless when the seed is decayed, but rather pleasant and sweetish, like that of the common grey pea. No ill effect whatever followed.

III. From the same trees which yielded the pods a quantity of flowering twigs were collected, dried, and preserved. Six months after, from amongst the withered petals of several racemes, the young or embryonic legumes were carefully separated in an entire state. On counting the number of the latter contained in various distinct racemes, the maximum was found to be 13, minimum 8, average 10 legumes per raceme. 130 legumes weighed 30 grains, being the produce of 13 racemes. Thirty grains then, or 13 racemes of dried young legumes, were carefully administered to a rabbit, but produced no poisonous effect whatever.

IV. From the twigs above referred to, 50 grains of dried leaves were separated. The weight of these on an average was 5 leaves per grain, therefore 250 leaves in the 50 grains. These were carefully cut in small pieces, ℥iij. boiling water poured on them, and allowed to infuse for 45 minutes at a temperature of about 180° Fah. The infusion was then strained, the residue pressed, and the resulting liquid concentrated by evaporation to ʒvi., which had the following sensible properties:—*Colour*—semi-transparent greenish-yellow. *Smell*—sweetish, nauseous,—somewhat resembling a strong infusion of senna. *Taste*—sweetish, sickening. *Re-action*—neutral. The fluid having been drawn into a syringe was carefully injected into the stomach of a rabbit by an elastic catheter. The effect was absolutely nil.

It will be observed that the above experiments were made with dried mature and dried immature portions of the plant. The following were performed with fresh green parts:—

Flowers.—Seventeen fresh racemes, including stalks, weighing ʒvii., and bearing 286 flowers, or an average of about 17 flowers to each raceme; weight, minus stalks, ʒvi. These 286 flowers, carefully separated from their stalks, were infused in ℥iv. of water, and the fluid concentrated to ℥i. *Colour*—light yellowish-brown. *Re-action*—acid. *Taste*—nauseous. This was conveyed into the stomach of a rabbit, but produced no bad effect.

Leaves.—ʒiv. of leaves, minus stalks, and numbering 200, were infused in water, and the liquid concentrated to ℥i. *Colour*—Blueish-black by reflected, and brownish-red by transmitted light. *Re-action*—acid. *Taste*—nauseous. This was conveyed into the stomach of a rabbit, but produced no bad effect.

A handful of laburnum *racemes*, mixed with leaves, weighing fully ¼ lb., was put into a box with two rabbits. Eight hours after, the animals had consumed the whole, but remained lively and well.

Green seeds and pods.—Twenty-eight large pods, weighing 1 oz., and containing 260 almost fully developed seeds; the greenish juice of both pods and seeds having an acid re-action, were infused in water, and the liquid concentrated to ʒvi. *Colour*—yellowish-brown. *Re-action*—acid. *Taste*—sweetish, nauseous. This was conveyed into the stomach of a rabbit, but produced no ill effect.

Of *pods*, 5 oz., in various stages of growth, were put in an enclosure with the same animal shortly after the infusion had been given. Ten hours subsequently it was found that

2½ oz. were eaten, preference having been shown for the larger pods, all of which had disappeared. The remaining 2½ oz. were consumed during the ensuing 12 hours. Hence, in the space of about 24 hours, its stomach had received 6 oz. of green pods, numbering probably about 240, and containing not less than 1500 seeds. Still it remained lively and well.

The writer masticated and swallowed on one occasion two pods containing 16 seeds, and on another three pods containing 23 seeds, and weighing 35 grains. Rate of pulse and respiration previously noted. No change or ill effect whatever followed. Their taste, however, is so nauseous, that I should expect it to cause vomiting in a young child.

Bark.—Gave on two occasions to two rabbits ʒvi. of a decoction containing the strength of 70 and 100 grains of dried laburnum bark. The smaller quantity was given to a young animal, which almost immediately after lost all power of its posterior limbs. With these extended laterally, and resting on its flank, it threw its head back, which it twitched from side to side. Suddenly it seemed to recover the use of its limbs, ran a short distance, and, as if blind-struck its head against the wall of the room, then fell on its side in violent alternate opisthotonos and pleurosthotonos, the head being spasmodically drawn upwards and backwards. In half a minute after it was perfectly flaccid, respiration ceased, all movement gone, with the exception of a few slight muscular twitchings of the limbs, lasting but for some seconds.

On laying open the thorax and abdomen, the heart was found contracting, which it continued to do for 10 minutes. Auricular motion proceeded some time after the ventricles had ceased to act. Lungs collapsed. Active vermicular action of intestines of short duration. Stomach filled with soft green pulp. No apparent pathological changes.

On the second occasion the phenomena were identical with those of the first, but were less speedily developed, excepting the loss of power in the posterior limbs, which occurred at once. The animal was able for about three minutes to maintain something like a sitting posture, being supported by its forelegs; while its head was held rigidly upwards and backwards, as if tightened by a bridle. There were also the lateral twitchings of the head, as in the previous case, with a marked constriction round the body in the course of the diaphragm. It then made a few short bounds, dragging its powerless limbs across the floor, when suddenly, as if shot, it fell on its side in extremely violent contortions, which lasted not more than 15 seconds, and ceased, as they began, almost instantaneously,—leaving it remarkably flaccid. On exposure of the thoracic and abdominal viscera, the lungs were found collapsed, the auricles still contracting, and the right ventricle distended with dark blood. There was also active vermicular action of the intestines. The stomach was ligatured and removed. It contained about two oz. of a green juicy pulp, which, on examination, proved to be a shreddy mass of vegetable matter soaked with the decoction of the bark just administered.

It will be observed that the quantities used in the experiments are *very much larger* than would probably be eaten by a child in any of the alleged cases of poisoning. These results seem, therefore, to prove that the *bark* is the only part of the laburnum which contains enough of the poisonous principle to render it noxious in quantities such as a human being could be thought at all likely to eat; and that the alleged cases of poisoning by the flowers, seeds, and other parts of the plant, are to be attributed to portions of the bark swallowed along with these. It is remarkable, in confirmation of this conclusion, that the rabbit which devoured the pods in their fresh state readily, carefully avoided the stalks, including, of course, the bark covering them. These experiments also confirm Prof. Christison's results, who found that one oz. of the infusion of laburnum bark, containing the active principle of 62 grains, poisoned a full grown rabbit in 2½ minutes; while another speedily died after eating greens merely impregnated with the infusion.*

* *Edinburgh Medical and Surgical Journal.* 1843. P. 303.

[*Note by the Editors.*—In the June number of the *Journal de Pharmacie et de Chimie* we are informed that M.M. Aug. Husemann and Marmé have discovered a new alkaloid, *Cytisine*, in the seeds of *Cytisus Laburnum.* It has a bitter, caustic taste; is not deliquescent; melts at 154°5 C., and at a higher temperature sublimes in needle-shaped crystals. It is soluble in almost all proportions in water and in alcohol; but is almost insoluble in ether, chloroform, benzine, and sulphide of carbon. Chemically it is one of the most active of vegetable alkaloids, and decomposes the salts of ammonia at ordinary temperatures. Its nitrate and muriate are easily crystallizable, but not the salts of the other mineral acids. The authors state that cytisine exists in all parts of the plant except the wood, and that it seems most abundant in the seeds. It is found in all the cytisus tribe. It acts physiologically as a powerful emetic. A few decigrammes injected sub-cutaneously killed a large dog. The poison acts by causing asphyxia, and the toxic effects can be overcome by maintaining artificial respiration for from half-an-hour to one hour. Minute directions for the separation and detection of this alkaloid are given.]

VII.—NOTES OF PRACTICE IN SAMOA.

By GEORGE A. TURNER, M.B., *Samoan Medical Mission, Island of Malua, South Pacific.**

DURING the year 1868–9, there were treated 1166 cases which may be classified as medical, 388 as surgical, besides 184 cases of affections of the eye and 150 of the skin.

We shall glance at a few particulars worth noticing in connection with some of these cases.

Chest affections of all kinds:— Cough, Asthma, Bronchitis, Phthisis &c., are very prevalent. This is to be accounted for principally by the extreme carelessness of the natives sitting down right in a strong draught in order to cool, or exposing themselves to the injurious night dews which are so heavy in these islands.

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* Extracted from Dr Turner's first Annual Report. We hope Dr T. will prosecute his enquiries into such diseases as are either peculiar to or more prevalent in the South Pacific islands, and favour us with the result; and that our other friends abroad will do the same.—ED. COM.

Of all diseases here, as elsewhere, *Dyspepsia* is the most common, and in all its varieties. The natives have only one principal meal daily, and that they take about seven o'clock in the evening. Of course, like all uncivilised nations, they eat ravenously, are not particular about well masticating their food, nor does it much matter whether it is well cooked. They partake freely also of rich dishes made with the expressed juice of the mature cocoa-nut, of raw and unripe vegetables and fruits, &c., add to this that they are, women as well as men, immoderate smokers, and you have ample reasons for the large number of 219 Dyspeptic cases.

Elephantiasis Arabum:— This disease prevails to a fearful extent. It most commonly affects the leg, scrotum, or breast of females, and more rarely the arm. When it attacks the leg, for example, the patient first feels one or two of the inguinal glands swollen and painful, then rigors, headache, and other symptoms of acute pyrexia set in, followed by swelling of the limb with redness, heat, and pain. By degrees the acute symptoms subside but the leg remains swollen. This swelling is not much noticed after the first or second attack, but it often gets to an enormous size after some years, and then relief is experienced—the attacks become less frequent and much less severe, and the only inconvenience complained of by the patient, is having to drag about with him such a huge mass. I have seen some enormous tumours of the scrotum of this species. One was the exact counterpart of the woodcut in Erichsen's Surgery, 4th Edit. p. 1199. It hung down below the knees and measured thirty eight inches at its greatest circumference.

The causes of this disease are very obscure. Many of the natives and foreign residents ascribe it to the heat of the sun. The correctness of this theory I very much doubt. There is very little, if any, elephantiasis on many of the low, porous, *coral* islands around us. It seems to flourish more on larger islands of volcanic formation, such as those of this group, where there is abundance of dense, luxuriant vegetation and decaying vegetable matter. Then again it is noted as being much more common in certain districts on these islands than in others. These districts are low-lying and swampy. Of course my knowledge of this complaint is as yet very limited, but the enquiries which I have made on this subject would seem to point to the following conclusions:—That the disease is owing to a species of Malaria. That the noxious miasms are produced *mainly* by decomposing vegetable matter. That the prevalence of it among the natives may be ascribed to the improper and unhealthy food which they frequently use; to the fact that as, especially among the men, no other garment is usually worn than a cloth round the waist, no protection is afforded against these noxious terrestrial emanations; to the open and unprotected state of many of their houses; and probably to the exhausting effect of exposure to the burning sun, rendering their bodies more liable to the baneful influence of these miasms. I have not yet seen in these islands any true case of Quotidian, Tertian, or Quartan Ague, and I have often thought that Elephantiasis must be simply a species of Ague, and that if the febrile attacks could be checked the limbs would not swell.

Acting upon this theory I have given large doses of Quinine with the very best results. One man who came to me as a servant about eight months ago was very subject to these attacks. They were very severe, sometimes confining him to bed for a fortnight. Since he came he has had some six or eight attacks, but he has not been 24 hours off his work at any time, nor have his legs swollen with any of these attacks. The treatment which I adopted was to give him an aperient and diaphoretic draught as soon as the febrile stage set in. Then as soon as that acted, I gave him twenty grains of Quinine followed in a few hours by a second twenty grain dose. By this the attacks seemed to be effectually checked. I have tried the same treatment in several other cases, and have always found it effectual. Between the attacks too, I imagine a course of Quinine would be of great benefit, but whether it would, if persevered in, be the means of warding off the attacks entirely, I have, as yet, no data to judge from. Recently I have tried Sulphate of Cinchonia as a substitute for Quinine, and it seems the more efficacious of the two. It checks the attacks more speedily and the dose required is less.

The *Fevers* I have met with are principally of the mild form (Febricula), caused by errors of diet, &c. Two or three cases, however, of *Remittent* fever have been seen. The true *Typhus* and *Enteric* fevers of colder climates are I believe totally unknown here.

In the month of September we had a slight epidemic of *Influenza.* It seemed to make itself felt in the extreme west of the group first, and then moved eastward. Most of the cases were very mild.

Rheumatism is very prevalent. The causes which I have enumerated as giving rise to chest affections sufficiently account for the prevalence of this disease. The cases were all chronic, with the exception of two, in both of which *Acute Rheumatic Fever* was fully developed, which however rapidly yielded to the alkaline treatment, with blisters to one or two of the most severely affected joints.

From the universal custom of eating unripe fruits and raw vegetables, cases of *Intestinal worms* have not been rare.

The *Surgical cases*, although not very numerous, have been interesting.

Bronchocele:—A few cases have come for relief. Only one, however, was of large size, and in this case (a female) I had recourse to the treatment which has proved so successful in India. I gave the patient red iodide of mercury ointment (16 grs to the ounce) to rub thoroughly into the tumour every day for a week. Then one morning I covered the tumour with the ointment and made her sit in the sun for five or six hours, covering herself as well as possible and only exposing the tumour. I then spread the ointment all over the tumour again, and sent her home, telling her to return in a few days. When she did so the tumour, which had been somewhat larger than a child's head, was quite noticeably reduced in size. The skin was still raw, and so I sent her home to her own village on the other side of the island, after having obtained a promise from her that she would return in three or four months and let me see her again. If deemed necessary, the operation was then to be repeated. Unfortunately, about two months after she left, the war broke out, the district in which she lived was deserted, and all the people fled for refuge to a neutral district further away from us, and so I have not seen her since. I hope, however, that she will keep her promise, and at some subsequent date I may be able to narrate the issue of this case.

Cancer:—Only one case of *Cancer (Epithelioma)* came under notice during the year. The patient was an American, who has been resident here for about thirty years, and is over sixty years of age. The disease involved a large porof the lower lip towards the right angle of the mouth. I operated on him on the 7th April, with the assistance of the Revs. Messrs Whitmee and Davies. He was put under chloroform, and the incisions carried from the right angle of the mouth about an inch outwards and slightly downwards, and then along below the lower lip to a point half an inch from the left angle of the mouth, thus removing a large triangular portion. The lower edge of the wound was then brought up and adjusted so as to form a new lower lip, and the case healed rapidly, leaving a very good mouth.

Cancrum oris:—Four cases have been seen, all of them since the war broke out. No doubt these are to be traced to the bad food and crowding occasioned by the war. These cases were all in children under three years of age, and were far advanced when first seen. The cheek, which was in all the cases the right one, was swollen, tense, hard and shining, with a dark, circular, gangrenous cavity in the centre, opening into the mouth, through which the saliva and putrescent matters were freely escaping. Three out of the four died in spite of all efforts to save their lives, but in the fourth case the treatment adopted proved effectual, even after the disease was far advanced.

Of *Ear affections* during the year I have seen thirty-two, cases of *Otorrhœa* constituting more than one half.

Gunshot wounds:—The first brought to me was about ten months ago, and was received while a grand review of the Saleimoa Volunteer force was being held. Some of the men had been handling their guns carelessly, and a young man got a blank cartridge driven in right between his eyes, causing a deep ugly wound. I applied poultices till the sloughs came away, and then dressed the wound with a solution of Carbolic acid in oil, and it rapidly healed. The eyes, which had of course been much irritated, also recovered completely.

Early on the morning after the first skirmish between the two war parties in March last a man was brought who had been shot in the head. The bullet, which had come from behind, had gone through the concha of the left ear, through the meatus auditorius externus, run round the skull fracturing the zygoma, and passed out about two inches above the internal angle of the left eye. I dressed the wounds twice and then his friends took him home, some fifty miles from this. I have not seen him since, but I heard recently that he recovered.

In another case the shot was fired while the patient was sitting on the ground. The ball went in through his mouth, shattering the whole of the left half of the lower jaw, passing out about an inch below the left angle of the jaw, and again entering the body about the centre of the clavicle, which bone it also fractured badly. The natives affirmed that the ball had gone further in, but I could not discover it, nor any passage inwards, on examination by probe, so I fancy it must have spent its force on the clavicle and dropped out. The mouth was dreadfully disfigured, portions of the lower jaw having been literally ground to powder. I removed on that day eighteen fragments of the lower jaw, two of which were over one and a half inches long and three-quarters of an inch broad. The teeth, too, were all lying loose in the mouth and had to be picked out. Two or three small portions of the clavicle were also removed, and both wounds were then carefully dressed. When next brought, two or three more fragments of the bones were removed and the wounds again dressed. His friends then took him home, and I have not seen him since, though I heard some time ago that he was getting strong and well again. Another case happened more recently at a great political gathering which was held about five miles from here. A young man was in the act of firing a gun, when it exploded and wounded his hand so badly that the little finger and half of its metacarpal bone had to be removed.

Besides the above cases, I have seen several other gunshot wounds of the hand, one of the thigh, a sinus of about six inches in length formed by a bullet in the wall of the abdomen over the stomach, and two compound fractures of the humerus. Many more cases of a far more serious nature would have been brought during the time of actual fighting had it not been for the great dread the natives have of amputation. They are afraid of the disgrace of being without a limb. They would be laughed at, and therefore would rather die. These feelings, however, will pass away as they gain confidence in British Surgery.

Wounds:—An awkward case occurred one day while my father was out with some natives measuring a piece of ground which we were about to add to the Institution grounds. Several of the men were using axes to clear the path, and one of them carelessly aimed a blow at the stem of a papaw apple, without noticing that the leg of another man was close behind it. The axe passed right through the stem of the tree and into the man's leg just above the heel, severing the tendo achilles and only clearing the posterior tibial artery by less than an eighth of an inch. The wound healed rapidly. A man was brought to me while I was over on Savaii (an adjoining island) in February. He had committed adultery with the wife of another man. A friend of the latter watched his chance for revenging the insult thus offered to the family, and stealing behind the adulterer as he was sitting on the ground, he thrust him through with a bayonet. The weapon went in just under the scapula, and came out between the third and fourth ribs on the right side, about two inches from the border of the sternum. There was very little bleeding and no Emphysema. I carefully dressed the wounds, and they rapidly healed without a single untoward symptom. A servant of my father met with an accident while trying to secure a young bull which had broken loose. It made a rush at him, and in trying to escape he tripped and fell. The animal attempted to gore him. Its horns just missed his body, but tore open the scrotum exposing the whole of the right testicle, fortunately, however, leaving it quite uninjured. The wound was carefully stitched and dressed, and this case also rapidly recovered. In the most of these cases carbolic acid dressing was employed.

The cases of *Eye Disease* have not been so numerous as would have been expected from the constant exposure of the natives to the full glare of the sun in fishing, &c., although perhaps they are rather numerous when one considers the limited population of the islands (34,000), and the fact that very many eye cases, more especially the simpler ones, are treated by the missionaries at the various mission stations. *Conjunctivitis* (78) is the most common of these affections, and next come in their order *Opacities of the cornea* (24), *Pterygium* (21), *Staphyloma* (13), and *Purulent Ophthalmia* (12).

Skin Diseases:—These are rather numerous and very interesting. To my great surprise cases of *Scabies* have been very rare, and I have not seen a single case of *Psoriasis* during the year. The most common skin affection which I have seen is *Framboesia,* or the yaws. In this disease I have found that most reliance is to be placed upon mercurials—Calomel or Hyd. c. creta. A few doses made the pustules shrivel up and disappear, but whether the cure is permanent or not I have not yet been able to determine. I thought it was till recently, when one or two old cases, in which the pustules had entirely disappeared under the use of mercury, again made their appearance with a new crop springing up. Next in frequency comes *Eczema Rimosum.* This affection, as well as *Warts,* is very often met with on the soles of the feet, caused by the constant irritation in walking barefooted on the roads, and wading in the lagoon, treading on coral patches, &c. The cracks cause very great pain, and are of course very difficult to heal. I have found Liq. Arsenicalis the most effectual drug in these cases, and at the same time I always endeavour to impress upon the natives the necessity of wearing shoes or sandals, as no medicine can benefit the affection so long as the feet are continually exposed to the irritation. Following these affections in order of frequency come *Ringworm* (16), with *Lichen tropicus* (16). In the latter affection oxide of zinc ointment with a gentle aperient seems in nearly all cases to afford almost immediate relief. *Pityriasis Versicolor* is very common. All such affections are difficult to cure among the natives, on account of their skins being so saturated with oil that any lotion runs off. So in this case I have tried lotions of Carbolic acid and corrosive sublimate, but with no effect. It speedily yields, however, to the Ungt. Hyd. Iod. Rubri.

There is one affection which has puzzled me very much, and which deserves especial notice. I have seen five cases of it during the year, and have set it down as *Herpes Desquamans.* The first case of it I saw I at once thought was a case of *Ichthyosis,* but a closer examination shewed me that it was neither *Ichthyosis,* nor any other disease which I had before seen. The Samoans call it *Lafa Tokelau,* or *Tokelau Ringworm,* and say that it is a new disease among them, having recently been introduced from Tokelau or Bowditch Island. There is at present in the Institution here a native of Bowditch Island, and from him the following interesting particulars were obtained regarding this curious disease. It was unknown at Bowditch till about ten years ago, when it was introduced by a man, copper coloured like themselves, and said to be a native of Tamana, one of the Gilbert Group, who landed from a whaler that called there. His name was Peter, and hence the disease is called at Bowditch *Le Pita*—the Peter. It prevails among natives of both sexes, young and old, and is markedly contagious. No remedy is known for it except the *moxa,* which they apply at any spot where it seems on the point of breaking out. It is said, however, that if left to itself it occasionally dies out after a time. It is a scaly disease—much more like *Ichthyosis* in its general appearance than any other disease with which I am acquainted. The scales, however, differ from those of *Ichthyosis* in that they are not disposed in squares. They run in concentric circles, and may be well represented by taking a sheet of stout cardboard and shaving the upper layer of it in such a way as to make it curl up in circles. The rings of desquamated cuticle are about a quarter of an inch apart. There are few cases of it to be met with on this island, but on the adjacent island of Tutuila they are more common. The natives have a very wholesome dread of it, and many of them, if they fancy they see it appearing on any part of the skin, cut out the affected portion or destroy the skin with the moxa. As stated above, it is very contagious, running through whole families. A good instance of this is shown in a case that was under my care for some time. He was a native carpenter, and while away from home at work he slept one night with a man who had the disease. Very soon after it appeared on him, and from him one of his daughters and others of the family took it. He had it on his thighs and pelvis. His daughter was covered with it from the neck downwards. Another case of it, a boy, was covered in the same way. There was only a very slight inflammatory line at a few places where the skin curled off from the surface. The patients all complained of heat and intense itching. I have as yet only seen a few cases of it, and the most of these came from a distance, so that I had not them so much under my eye as I should have liked. My impression is that it is a parasitic disease, but as yet I have not succeeded in discovering any parasite, nor can I speak definitely of any treatment which has proved successful. I tried a lotion of carbolic acid in four cases. In three of them it appeared to fail to remove it entirely, though in all the cases it greatly relieved the itching. The fourth case was that of an elderly man, to whom I gave a little carbolic acid dissolved in glycerine and oil. He came back after a few days saying it was much better, the itching was almost gone and the scales were disappearing. The lotion was finished. I gave him some more, and as he had to go home—about forty miles—I begged him to come and let me see him again, whether he got rid of the complaint or not; if he got rid of it, to let others get the benefit of his experience, and if not, to try some other remedy. This he faithfully promised to do, but although some eight or nine months have elapsed since then, I have not again seen him. I fancy in this case a cure has been effected because he was *extremely* anxious to be cured, and I cannot but think he would have been sure to return had the lotion failed. In the case of the carpenter mentioned above, the carbolic acid lotion seemed to fail, so also did a lotion of corrosive sublimate which I next tried, but whether these failures resulted from insufficient or careless application I am not prepared to say. I fear he gave neither of them a fair trial. I next tried the Ungt. Hyd. Iod. Rubri and it seemed to be curing the disease, when the war broke out and my patient joined one of the war parties and was killed.

I have heard it stated that the complaint which I have here been describing is just a variety of psoriasis, but I think any one who is at all conversant with skin diseases will at once see that we have in this a very different disease from psoriasis to deal with. I hope to see other cases, and shall then endeavour to investigate it more fully.

VIII.—SHORT COMMUNICATIONS.

1.—Case of Protracted Pregnancy,* *by* A. L. Kelly, M.D., F.F.P.S.G.

That gestation, or the duration of pregnancy, sometimes proceeds beyond the usually recognised period of 273 days, (thirty-nine weeks, or nine calendar months, counting from the time the patient has ceased to menstruate), or of 280 days, (forty weeks, or ten lunar months, counting from the time of sexual union), is, I doubt not, the experience of all who are much engaged in obstetric practice. Every one of us can bear testimony to the frequency with which our ears are greeted, after an accouchement, with our patient's sincere declaration that such was expected three or four or even six weeks ago; but the evidence adduced upon this point is so unsatisfactory and unreliable, that we hear such statements as we heard them not.

The following case, however, is so free from many circumstances calculated to confuse and thwart investigation, that I have ventured to bring it before you. It is as follows:—

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* Read at the meeting of the Glasgow Southern Medical Society, 12th May, 1870.

M. A., aged 25 years, a strong, healthy, well-developed, intelligent, and unmarried young woman, accustomed to active daily exercise, was spending a few days with her sister in a country farmhouse, when, on the 9th May, 1869, a young man, just returned from America, who had formerly been a lover, called,—found her alone,—her sister and husband having gone a short distance to a neighbouring farm,—commenced to tease and jostle her, subsequently to violate her, which he succeeded in accomplishing after an obstinate struggle; indeed, so severe and lengthened, that she became exhausted and unconscious, and knew not what had occurred for a long time afterwards.

Such is this young person's statement, which I have no cause to distrust; because, previous to this misfortune, her conversation and actions were irreproachable.

Fully three weeks had elapsed from her last menstruation, she therefore expected another change in a few days, which did apparently take place, but was small in quantity, and only continued part of one day. Between two and three months after this event I was consulted regarding her condition. Sickness, loss of appetite, vertigo, and general weakness were her chief ailments, but she also informed me of a painless, sudden, and great discharge of blood (per vag.) which she had had that same morning. I began to question her somewhat more minutely, when she at length made the confession as related. A discharge similar but somewhat more copious escaped on two subsequent occasions. Upon one of these I was requested to visit her, when I found her weak, faint, and pale,—her extremities cold, and, indicative of the severe and profuse nature of the hæmorrhage, her own and her bed-clothes were saturated with blood. Besides this, a common wash-hand basin was shown me three-fourths filled with blood, chiefly in large clots, which was still continuing to flow per vaginam with a brief pause, then a recurrence every few minutes, with pretty severe pain. Uterine contractions and pains were frequent, and had been so for three hours before my visit. An examination was made, and a few enquiries elicited the fact of violent exertion having been made the previous day. I therefore concluded that this was accidental hæmorrhage, resulting, I had no doubt, as upon the former times, from some partial detachment of the placenta from the uterus, but formidable at this time from the more advanced stage of utero-gestation and the augmented calibre of the blood-vessels. After successfully arresting these perilous symptoms, nothing worthy of particular attention or enumeration occurred until the morning of the 8th March, when labour set in, which continued steady and severe, strongly expulsive, till the evening of the 10th. Her strength then began to fail, and her efforts being fruitless, the forceps was employed, and a large, living female child was extracted. The mother had a good recovery, and the child continues still to thrive and do well.

Looking back, then, to the 9th May, 1869, when this single sexual conjunction unhappily took place, and reckoning onwards till 10th March, 1870, we have a period of 305 days. I do not wish you to consider this coitus as the commencement of pregnancy. It only fixes the date of effective intercourse, and the period during which the female body contained seminal matter. The difficulty is to determine what time now elapsed before the semen coming in contact with the female ovum exerted its peculiar and mysterious influence constituting impregnation.

That some very marked and important change did soon follow the connection must be regarded as already demonstrated by the brief and scanty appearance of the catamenia. Had the menstrual flow been copious the semen might have been removed by it. But either the uterine system had been influenced in such a way as to discharge only scanty catamenia, and so prevent this removal; or the semen had already permeated the fallopian tubes, and was removed beyond the reach of the menstrual discharge.

Now, it has been shown by modern researches that it is at the time of this discharge that the ovum leaves the graafian vesicle and passes along the fallopian tube, prepared to meet any seminal matter that may have permeated thither, and thus to constitute conception. Supposing then that this was what took place in the case of M. A., and granting that a few (say five) days elapsed between the time of union and the catamenia, we have still the long period of 300 days between impregnation and parturition.

This case I regard as rare and exceptional, but the evidence we possess bearing upon the whole case must be admitted to be of great value, indeed, I almost think, conclusive. It is therefore all the more important and interesting in a physiological as well as in a medico-legal point of view to note the extreme limits within which utero-gestation may be considered possible. We all see and have had experience of cases in which, from various causes, the duration of pregnancy has been accidentally shortened without injuring the child. Is it possible at the same time that in other cases one important and often alarming cause (I allude to hæmorrhage) could prolong or cause deviations from what is reckoned the invariable or natural duration, by arresting the growth and development of the child, and thus retarding its perfection and maturity?

2.—A Case of Fatal Poisoning by Chloride of Zinc (Burnett's Disinfecting Fluid), *by* John Brunton, M.A., M.D., *London.*

In Traill's work on Medical Jurisprudence, at page 115, the following sentence occurs:—"The only salt of zinc likely to become an object to the toxicologist is the sulphate or white vitriol." The chloride is not even mentioned. Professor Taylor relates a number of cases of poisoning by the chloride. In some of the cases the patient recovered; in most of the fatal cases, death was from the secondary effects of the poison. I am induced, therefore, to relate a case of rapid death caused by swallowing a large quantity of this irritant poison:—

On the night of the 10th of January, 1870, I was called to a house in a neighbouring street to see S. B., aged 52, who was reported to have taken poison. On my arrival, at 12·30, I found Mrs B. suffering from the effects of an irritant poison. Her features indicated great agony. She was unable to speak. At last she made an effort to reply to questions asked, but the power of articulation was gone; all the answer I could get to the question, "What poison have you taken?" was a negative head-shake. I named the various irritant poisons, but got the same negative. I therefore thought that she had taken an irritant poison with the intention of committing suicide, and on interrogation of her friends I got the following history:—

She had been ill for some weeks, and was attended by a nurse (now present). She was somewhat desponding about her worldly affairs—thought that she had not enough to live on to the end of her days; yet during her illness she had manifested no signs of self-destruction—in fact, she had not been without the nurse in her presence until two days before, when she desired to go out for an hour to see her sister. As she had recovered so far, the nurse gave permission; her visit was made to her sister, and, as what follows will show, she purchased a bottle of Burnett's disinfecting fluid.

On the morning of the day on which she took the poison she told the nurse that as she had so far recovered she could dispense now with her services. In the evening the nurse went away, and at 11 o'clock Mrs B was found sitting in bed in great agony. Between 11 and 12 she had vomited once or twice, and had liquid motions in bed. Unfortunately, the friends who found her had emptied the vomited matters, so that when I arrived I could get no clue to the poison except a tumbler which stood on the table, at the bottom of which there were about three drops of clear liquid. The room was searched for papers and bottles, but none could be found; and, as mentioned above, the sufferer would not or could not tell what poison she had taken.

Before proceeding further, it will be better to describe the patient's state as I found her:—She was sitting up in bed, bent forwards, her hands clasped on her abdomen; she was pale, anæmic, withered-looking, eyes staring, tongue protruding, white saliva flowing freely and running down over her night-dress; all the mucous membrane of her mouth was white and leathery; skin cold and moist; pulse small and compressible, 120; breathing difficult and irregular; extremities cold; thighs drawn up on abdomen; legs flexed. She continually kept groaning huskily, and had all the expression of one suffering great agony.

I at first thought that she had taken that common poison, oxalic acid; so I scraped the wall and gave to her milk mixed with lime. I, however, soon saw that she could not swallow, and that death was rapidly nearing. About half an hour afterwards she quietly died, collapse being extreme.

On account of the non-discovery in her room of the poison taken, I was in a difficulty as to what the poison might be; so I took home the tumbler with the few drops and made a careful analysis. By Reinsch's process I excluded the metallic group—arsenic, antimony, mercury, and bismuth. I tested for oxalic acid with negative results, and after careful analysis I arrived at chloride of zinc.

Instructions having been given to the coroner's officer, a *post mortem* examination was ordered, and performed by me next day, when the following appearances were observed:

Head—Brain congested throughout; sub-arachnoid effusion of lymph on the vertex on both hemispheres; no softening; fluid in ventricles natural. *Mouth*—Tongue white and leathery; mucous membrane of mouth and fauces white and leathery; no ulcerations externally; no marks of irritant poison such as met with in poisoning by strong acid. *Gullet* and *Æsophagus*—Contracted and leathery, soft and easily torn. *Larynx*—White and leathery. *Trachea*, down to the bifurcation of the bronchi, the same. *Stomach*—Contained about a half-pint of clear liquid, and was very contracted; leathery; no ulceration anywhere. *Duodenum* and *Jejunum* the same. Down to the rectum the whole small intestine was white and leathery, without any distinct ulceration—in fact, the intestines were contracted and withered up. The surface of the *Liver* was white and bleached and hard; the substance was congested. *Spleen* the same. *Kidneys* the same. In the abdominal cavity there was some effused fluid which smarted the hands during the *P.M.* *Heart*—fatty, and both sides empty. *Lungs*—congested; a little serous fluid in each pleural cavity. *Bladder*—empty.

I took away the stomach and part of small intestine for analysis, and found that the fluid contained therein corresponded in chemical nature with that found in the tumbler,—that it contained a large quantity of chloride of zinc.

Up to the day of inquest we got no clue as to how Mrs S. obtained the poison, but on that day the coroner's officer, while clearing the room, discovered an empty bottle labelled, "Sir William Burnett's disinfecting fluid," carefully concealed in the coal-scuttle. This bottle was produced at the inquest, and a drop or so that remained in it tasted exactly the same as that I found in the tumbler and in the stomach.

A verdict of suicide while in a state of unsound mind was delivered.

Remarks.—The *post mortem* appearance of the brain, coupled with the long illness, throw light upon the suicidal tendency, and the deliberate nature of the suicide is well shown in the artfulness displayed in obtaining the bottle, and in concealing it before taking the fatal dose. Then as to the quantity taken,—according to Prof. Taylor, half a wine-glassful contains about 100 grains, so that if Mrs B. took half-a-pint of the liquid, she would take about 800 grains,—an enormous quantity. The *post mortem* appearances indicate such a dose, so do the symptoms during life,—vomiting, purging, collapse, loss of voice, corrosion of the mucous membranes, and rapid death.

3.—EXPERIMENTS ON THE EFFECTS OF ALCOHOL (ETHYL ALCOHOL) ON THE HUMAN BODY, *by* E. A. PARKES, M.D., F.R.S., *Professor of Hygiene in the Army Medical School, and* Count CYPRIAN WOLLOWICZ, M.D., *Assistant Surgeon, Army Medical Staff.*[*]

As a knowledge of the physiological effects of alcohol on the human body is a matter of great importance, and as previous observations leave some points in doubt, we took the opportunity which the willingness and zeal of a very intelligent healthy soldier afforded us of investigating this subject. In order not to lengthen the paper, we have given only our own observations, without referring to those of others.

The plan of observation was as follows:—For twenty-six days the man remained on a diet precisely similar as to food and times of meals in every respect, except that for the first eight days he took only water (in the shape of coffee, tea, and simple water); for the next six days he added to this diet rectified spirit, in such proportion that he took, in divided quantities, on the first day one fluid ounce (= 28·4 cub. centims.) of absolute alcohol; on the second day two fluid ounces; on the third day four ounces, and on the fifth and sixth days eight ounces on each day. He then returned to water for six days, and then for three days took on each day half a bottle (= 12 ounces, or 341 c. c.) of fine brandy, containing 48 per cent. of alcohol. Then for three days more he returned to water.

There were thus five periods, viz., of water-drinking, alcohol, water, brandy, water.

Before commencing the experiments, the man, who had been accustomed to take one or two pints of beer daily, abstained altogether from any alcoholic liquid for ten days.

This man, F. B., is twenty-eight years of age, 5 feet 6 inches in height, and his usual weight is 134 or 136 lbs. He is finely formed, with little fat, and with largely developed powerful muscles; he has a clean smooth skin, a clear bright eye, good teeth, and is in all respects in perfect health. He is very intelligent, and assisted us so much that we are quite certain that there has not been a mistake even for a minute in the time of taking the temperatures and passing the urine. As he had always been accustomed to smoke, we thought it proper to allow him half an ounce of tobacco daily, for fear the deprivation of it might disturb his health.

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[*] We make no apology for reproducing that part of this valuable paper from the Proceedings of the Royal Society, No. 120, (Read 19th May), which comprises the conclusions. The entire paper is worthy of study as a model of the experimental treatment of a physiological question of great practical importance. ED. COM.

In addition to the experiments recorded in this paper, we tested the accuracy of his vision, and the muscular power before and during the use of alcohol; but as we could not detect any difference, we do not give the experiments.

Our object being to test the dietetic effects of alcohol, we gave it in small and large quantities, but avoided producing any extreme symptoms of narcotism.

* * * * * * *

General Conclusions.

1. One and two fluid ounces (28·4 c. c. and 56·8 c. c.) of absolute alcohol given in divided quantities in 24 hours to a perfectly healthy man seemed to increase the appetite. Four fluid ounces lessened it considerably; and larger quantities almost entirely destroyed it. On the last day of alcohol the man was three quarters of an hour eating 8 ounces of bread, and could hardly do so. Had he been left to his own wishes the amount of food taken would have been much diminished.

It appears, therefore, that in this individual some point near 2 fluid ounces of absolute alcohol is the limit of the useful action on appetite; but it is possible that if the alcohol had been continued a smaller quantity would have lessened appetite.

In other healthy persons it may be different from the above; in most cases of disease, when digestion is weakened, it seems probable that a much smaller amount of alcohol would destroy appetite.

2. The average number of beats of the heart in 24 hours (as calculated from 8 observations made in 14 hours), during the first or water period, was 106,000; in the alcoholic period it was 127,000, or about 21,000 more; and in the brandy period it was 131,000, or 25,000 more.

The highest of the daily means of the pulse observed during the first or water period was 77·5; but on this day two observations are deficient, The next highest daily mean was 77 beats.

If instead of the mean of the 8 days or 73·57 we compare the mean of this one day, viz. 77 beats per minute, with the alcoholic days, so as to be sure not to overestimate the action of the alcohol, we find:—

On the 9th day, with 1 fluid ounce of alcohol, the heart beat 4,300 times more.
On the 10th day, with 2 fluid ounces, 1872 times more.
On the 11th day, with 4 fluid ounces, 12,960 times more.
On the 12th day, with 6 fluid ounces, 30,672 times more.
On the 13th day, with 8 fluid ounces, 23,904 times more.
On the 14th day, with 8 fluid ounces, 25,488 times more.

But as there was ephemeral fever on the 12th day, it is right to make a deduction, and to estimate the number of beats in that day as midway between the 11th and 13th days, or 18,432. Adopting this, the mean daily excess of beats during the alcoholic days was 14,492, or an increase of rather more than 13 per cent.

The first day of alcohol gave an excess of 4 per cent., and the last of 23 per cent.; and the mean of these two gives almost the same per centage of excess as the mean of the 6 days.

Admitting that each beat of the heart was as strong during the alcoholic period as in the water period (and it was really more powerful), the heart on the last two days of alcohol was doing one-fifth more work.

Adopting the lowest estimate which has been given of the daily work done by the heart, viz. as equal to 122 tons lifted one foot, the heart during the alcoholic period did daily work in excess equal to lifting 15·8 tons one foot, and in the last two days did extra work to the amount of 24 tons lifted as far.

The period of rest for the heart was shortened, though perhaps not to such an extent as would be inferred from the number of beats; for each contraction was sooner over.

The heart on the fifth and sixth days after alcohol was left off, and apparently at the time when the last traces of alcohol were eliminated, showed in the sphygmographic tracings signs of unusual feebleness; and perhaps in consequence of this, when the brandy quickened the heart again, the tracings show a more rapid contraction of the ventricles, but less power than in the alcoholic period. The brandy acted, in fact, on a heart whose nutrition had not been perfectly restored.

The peripheral circulation was accelerated and the vessels were enlarged; and the effect was so marked as to show that this is an important influence for good or for evil when alcohol is used.

Referring only to this healthy man, it is clear that the amount of alcohol the heart will bear without losing its healthy sphygmographic tracing is small, and it must be supposed that some disease of heart or vessels would eventually follow the overaction produced by large doses of alcohol.

3. Although large doses of alcohol lessened appetite, they did not appear to impede primary digestion, as far as this could be judged of by the sensations of the man; nor did they seem to check the normal chemical changes in the body which end in the elimination of nitrogenous excreta, of phosporic acid, and of free acidity. In other words, we were unable to trace either the good or the evil ascribed to alcohol in this direction: it neither depressed these chemical changes nor obviously increased them; it neither saved the tissues nor exhausted them; and even in the period of ephemeral fever its effects were negative.

But, of course, in these experiments we were not dealing with diseased tissues, nor with structures altered in composition by long-continued excess of alcohol. The results in such cases might be different; and it may be desirable to repeat that though appetite was lessened, the amount of food taken was the same each day.

4. Neither pure alcohol nor brandy, in the quantities given, lessened the temperature; in other words, they did not arrest the chemical changes which produce animal heat, or lessen the processes which regulate its amount, any more than they influenced nitrogenous tissue-change. Alcohol in no way influenced the rise of temperature during the attack of ephemeral fever; it neither lowered nor increased it. This appears to us conclusive against the proposal to use alcohol as a reducer of febrile heat.

On the other hand it is not clear that alcohol increased the temperature: it produced subjective feelings of warmth in the stomach, in the face, round the loins, and over the shoulders; but at the time when these were felt (for about one hour after tolerably large doses) the thermometer in the axilla and rectum showed no rise. This is best seen by comparing the two o'clock observations, which were taken about half an hour after dinner. The feelings result from the enlargement of the vessels and the greater flow of blood through them; so also, the ephemeral fever was decidedly not made worse by it.

5. An effect on the nervous system was not proved by any evidence of increase or decline in the amount of phosphoric acid; but there were marked subjective feelings; and possibly also the increased action of the heart was a nervous condition, as the short contractions of the ventricle were like those ascribed to alterations in the nervous currents. The feelings which were produced by four fluid ounces daily, and in a still higher degree by the larger quantities of alcohol, proved that narcotism was produced. There was no exhilaration, but a degree of heaviness, indisposition to exertion, and loss of cheerfulness and alacrity; there was slight headache, and even some torpor and sleepiness. All these effects were more marked with brandy. The commencement of narcotism was therefore produced in this man by some quantity much less than 4 fluid ounces, and probably nearer 2. It was nearly this amount which also commenced to destroy the appetite; and it may also be observed that a considerable rise in the frequency of the pulse occurred on the third day of alcohol, when 4 ounces were taken, whereas on the days with one or two ounces the pulse, though quickened, was so in a much less degree.

Putting therefore these points together, viz. that the obvious effect on the nervous system (*i. e.* narcotism), the loss of appetite and a great rise in the quickness and frequency of the heart's beats occurred at the same time, it seems fair to conclude that there must be a relation between the phenomena, or, in other words, that all were owing to nervous implication.

It appears, then, clear, that any quantity over two ounces of absolute alcohol daily would certainly do harm to this man; but whether this, or even a smaller quantity, might not be hurtful if it were continued day after day, the experiments do not show. It is quite obvious that alcohol is not necessary for him; that is, that every function was perfectly performed without alcohol, and that even one ounce in twenty-four hours produced a decided effect on his heart, which was not necessary for his health, and perhaps, if the effect continued, would eventually lead to alterations in circulation, and to degeneration of tissues. It is not difficult to say what would be excess for him; but it is not easy to decide what would be moderation; it is only certain that it would be something under two fluid ounces of absolute alcohol in twenty-four hours.

It will be seen that the general result of our experiments is to confirm the opinions held by physicians as to what must be the indications of alcohol both in health and disease. The effects on appetite and on circulation are the practical points to seize; and if we are correct in our inferences, the commencement of narcotism marks the point when both appetite and circulation will begin to be damaged. As to the metamorphosis of nitrogenous tissues or to animal heat, it seems improbable that alcohol in quantities that can be properly used in diet has any effect; it appears to us unlikely (in the face of the chemical results) that it can enable the body to perform more work on less food, though by quickening a failing heart it may enable work to be done which otherwise could not be so. It may then act like the spur in the side of a horse, eliciting force, though not supplying it.

The employment of alcohol in health and disease is so great a subject that we should have felt tempted to extend these remarks to some points of medical practice, had it been desirable to do so in this place. We will only say that while we recognize in these experiments the great practical use of alcohol in rousing a failing appetite, exciting a feeble heart, and accelerating a languid capillary circulation, we have been strongly impressed with the necessity for great moderation and caution. In spite of our previous experience in the use of alcohol and brandy, we were hardly prepared for the ease with which appetite may be destroyed, the heart unduly excited, and the capillary circulation improperly increased. Considering its daily and almost universal use, there is no agent which seems to us to require more caution and more skill to obtain the good and to avoid the evil which its use entails.

We wish to guard ourselves against the supposition that in speaking of alcohol and brandy we refer at all to wine and beer, which contain substances, in addition to alcohol, which may make their action in nutrition somewhat different.

Reviews.

I. THE LIFE AND LETTERS OF FARADAY. *By* DR BENCE JONES, *Secretary of the Royal Institution.* In Two Volumes. Second Edition, Revised. London: Longmans, Green, & Co. 1870.

"TAKING him for all and all," says Dr Tyndall, himself no mean experimentalist, "I think it will be conceded that

Faraday was *the greatest experimental philosopher* the world has ever seen." He was not a mathematician. But, by patient, persevering interrogation of nature, and the pursuit of truth from fact to fact, aided by an almost intuitive perception of the whole horizon of relations, and by an "imagination which rose sometimes to divination or scientific second sight, and led him to anticipate results that he or others afterwards proved to be true," he rivalled the mathematician in the grandeur of his discoveries, and sometimes even equalled him in the speed and directness with which they were made. Indeed, it was reserved to Sir William Thomson to demonstrate by mathematics laws which Faraday had anticipated without their aid, and to marvel at the native vigour which had sustained him in his pilgrimage through regions which are difficult of access even by the subtile aid of mathematical reasoning. We may lose sight of the mathematician in his progress. His passage is, to ordinary minds, bird-like, and leaves no trace. But in the laboratory note-book of the Royal Institution, carefully numbered from 1 up to 16,041, we can still read every step of Faraday's "Experimental Researches," recorded by his own hand, with description of apparatus and arrangement and careful reference of every new inference to its parent fact. Prof. Reiss of Berlin once wrote to Faraday, "If Newton, not quite without reason, has been compared to a man who ascends to the top of a building by the help of a ladder, and cuts away most of the steps after he has done with them, it must be said that you have left to the follower, with scrupulous fidelity, the ladder in the same state as you have made use of it."

Every physician is, or ought to be, an "experimental philosopher." The first difficulty to be encountered and overcome by the observer of phenomena is the protection of his instruments of observation, his own mind included, from the influence of disturbing media. The astronomer must place his pool of mercury beyond the influence of the tremors of the railway and the highroad, that he may see the image of the star which he observes therein unbroken. There are, after all, *errors of observation* arising from his own mind. The practitioner of medicine lives, as a condition of his profession, far beneath the clear upper air which Faraday breathed, in a region where objects are distorted by the medium through which they are seen, and all the idols of the mind abound. Still the human mind is so uniform in constitution, that the dangers and temptations which beset both, differ more in degree than in kind It is, therefore, our intention to make a study of the scientific life of Faraday, in the hope of deriving some useful lessons therefrom, and with the conviction that the more closely we can follow in the footsteps of this Admirable Crichton of Science, and put ourselves under the guidance of his spirit, the purer and the nobler in our hands will our profession become.

Before advancing to the execution of this design, we may shortly discharge our duty as reviewers. The interest and value of Dr Jones' work depends more upon the matter than upon the manner. Although we have read these volumes with the greatest pleasure, and have found them more suited to our immediate purpose than if the biographer had fused those isolated records of a life in the crucible of his own mind, we question whether the majority of readers will not feel that the Life of Faraday has still to be written, and prefer, meanwhile, Tyndall's smaller and more readable book, "Faraday as a Discoverer." He has, indeed, accomplished well all that he intended, which was, as the Preface tells us, "to join together Faraday's own words, and to form them into a picture of his life which may almost be looked upon as an autobiography." He has executed his design with consummate skill and delicacy, modestly concealing himself and leaving the reader to the undivided companionship of the great philosopher. The result is, that we forget the labour of love which has collected material so abundant and so varied, and marshalled the abstruse scientific work of such a life with a clearness and complete mastery of its details, which implies in the biographer himself no small share of the spirit of the master, and also of solid attainment in science. It will always be regarded as a proud distinction that the biographer of Faraday belongs to the medical profession.

Michael Faraday was the son of a blacksmith, and was born 23rd September, 1791, at Newington, in Surrey. His parents removed when he was four years of age to Jacob's Well Mews, near Manchester Square, London. "His education was of the most ordinary description, consisting of little more than the rudiments of reading, writing, and arithmetic at a common day-school." During the distress of 1801 Michael was allowed one loaf weekly, so straightened in circumstances were his parents. In 1804 he began life as a message-boy to Mr Riebau, a neighbouring bookseller. His chief duty was to distribute and exchange newspapers lent by his master. In after life, he rarely saw a newspaper-boy without making some kind remark about him. He used to say, "I always felt a tenderness for these boys, because I once carried newspapers myself." Next year Faraday was apprenticed as a bookbinder, and the story of this part of his life cannot be better told than it was by himself fifty years afterwards. "I remained there eight years, and during the chief part of the time bound books. Now it was in those books, in the hours after work, that I found the beginning of my philosophy. There were two that especially helped me, the 'Encyclopædia Britannica,' from which I gained my first notions of electricity, and Mrs Marcet's 'Conversations on Chemistry,' which gave me my foundation in that science. Do not suppose that I was a very deep thinker, or was marked as a precocious person. I was a very lively, imaginative person, and could believe in the 'Arabian Nights' as easily as in the 'Encyclopædia;' but *facts were important to me and saved me. I could trust a fact, and always cross-examined an assertion.* So when I questioned Mrs Marcet's book by such little experiments as I could find means to perform, and found it true to the facts as I could understand them, I felt that I had got hold of an anchor in chemical knowledge, and clung fast to it." (II. 396.) At this time he constructed a rude electrical machine; he read "Watt's on the Mind," which "first made him think;" he attended lectures on natural philosophy at a shilling per lecture; he studied perspective that he might illustrate his notes of these lectures. That his mind was already determined to science as his life-study is shown by a note-book, intended, in the concluding words of its ample title, "to corroborate or invalidate those theories which are constantly starting into the world of science." The books and subjects noted are entirely scientific, chiefly chemical and electrical.

In the spring of 1812, Faraday first entered the scene of his future triumphs, the Royal Institution, through the kindness of one of his master's customers, as a hearer of the last four of a series of lectures by Sir Humphrey Davy. He wrote these lectures fully out, and he tells us that "the desire to be engaged in scientific occupation, even though of the lowest kind, induced me, while an apprentice, to write, in my ignorance of the world and simplicity of my mind, to Sir Joseph Banks, then president of the Royal Society. Naturally enough, 'no answer' was the reply left with the porter." (I. 14). We shall hear again of this MS. volume. Several letters are preserved written at this time to Mr

Benjamin Abbott, a young man of education, which are remarkable for the accuracy and fluency of their style, as well as the candour and modesty of their spirit. He tells his friend among other things how he made a galvanic battery. "The first I completed contained the immense number of seven pairs of plates!! and of the immense size of half-pence each!!!!" With this he "decomposed sulphate of magnesia." He then constructed a more powerful battery, and describes various other decompositions effected by its means. Indeed it is with "Faraday's first letter to Benj. Abbott," (I. 16) that his scientific life begins, and we see in their infancy that power of making the simplest experiments with the simplest of apparatus fruitful in results; that determination to receive nothing at second-hand, to "trust fact," and "cross-examine assertions," and already in its full vigour that honesty and simplicity of purpose leading him to uncover every stage of his mental processes, even the blunders, which are apparent throughout his entire life. He writes to Abbott, "I am not so self-opinionated as to suppose that my judgment or perception in this or other matters is better or clearer than that of other persons; nor do I mean to affirm that this is the true theory in reality, but only that my judgment conceives it to be so." (I. 29.) Many years after, Faraday wrote, "when I was a bookbinder's apprentice, I was very fond of experiment, and very averse to trade;" and these letters make it very plain in which direction the entire current of his thoughts was setting.

In October, 1812, Faraday became a journeyman, but his first master was a very passionate and troublesome man, a circumstance which did not tend to reconcile him to "trade." Ten days after entering on his new engagement, he writes to a friend—"With respect to the progress of the sciences I know but little, and am now likely to know still less; indeed, as long as I stop in my present situation (and I see no chance of getting out of it just yet) I must resign philosophy entirely to those who are more fortunate in the possession of time and means." (I. 45.) Two months later he made his second appeal for a "scientific occupation even though of the humblest kind," this time to Sir Humphrey Davy. Along with his application he sent his MS. volume of notes of Davy's lectures. The result was a very kind note and an interview in January, 1813, when Faraday and Sir Humphrey Davy first met, in the ante-room to the theatre of the Royal Institution. The philosopher advised the ambitious bookbinder to keep to his trade, promising to send as much work his way as possible. He took his advice. There was no help for it; but not many weeks after this interview, Faraday was startled late at night by the rattle of a carriage down Weymouth Street, and a letter was left by a footman at his mother's door, requesting him to call on Sir Humphrey Davy next morning. The result is thus recorded in the minutes of the meeting of Managers of the Royal Institution, under date 1st March, 1813. "Sir Humphrey Davy has the honour to inform the managers that he has found a person desirous to occupy the situation in the Institution lately filled by William Payne. His name is Michael Faraday. He is a youth of 22 years of age. As far as Sir H. D. has been able to observe or ascertain, he appears well-fitted for the situation. His habits seem good, his disposition active and cheerful, and his manner intelligent. He is willing to engage himself on the same terms as those given to Mr Payne at the time of quitting the Institution. *Resolved:* That Michael Faraday be engaged to fill the situation lately occupied by Mr Payne on the same terms." The situation was that of assistant in the Laboratory; the terms were 25s a week, with two rooms in the attics.

Faraday felt that he had now found all that a man wants—opportunity in the field of his choice. Proud of being in the service of science even as an acolyte; he wrote to his aunt: "I was formerly a bookseller and binder, but am now turned philosopher." His letters to his friends show him all day long at work under Davy's directions, experimenting on "the detonating compound of chlorine and azote," and mentioning incidentally how on several occasions there were explosions, wounding and endangering the eyesight both of master and assistant. "I am constantly engaged in observing the works of Nature, and tracing the manner in which she directs the management of the world." His activities were not confined to the Institution. He joined a Mutual Improvement Society called the "City Philosophical Society," whose members gave lectures in rotation on alternate Wednesdays, the intervening Wednesdays being devoted to discussion. Although he did not just yet take an active part in their business, it is apparent from several long letters written at this time, in which he gives at great length his ideas of lectures and lecturing, that Faraday was equipping himself for the future.

In the autumn, Sir Humphrey Davy went abroad and Faraday accompanied him as amanuensis. They were absent about a year and a half, and traversed France, Italy, and

Switzerland, combining sight-seeing with science. At the meetings of the Foreign Academies the assistant had an opportunity of seeing many men of note who afterwards became more familiar with his name. He kept a journal of which Dr Jones says very truly: "It is remarkable for the minuteness of the description of all he saw, and for its cautious silence regarding those he was with." Special prominence is given to all the scientific work in which he assisted, such as the examination into the properties of Iodine, but lately discovered by M. Courtois; the combustion of Diamonds by means of the Duke of Tuscany's great burning-glass; and Davy's investigations into the compounds of Chlorine. There is nothing in this Journal that is not suggestive of the acquisition of knowledge in the most favourable and delightful circumstances. But we learn from Faraday's letters that his humility and the constancy of his devotion to science were sorely tried throughout this continental tour. Sir Humphrey's valet refused to accompany him at the last moment, and Faraday good-naturedly agreed to do what he could to supply his place until they got to Paris. From one cause and another, stage after stage of the tour passed without the engagement of a lacquey, and so the amanuensis continued to perform duties which he disliked. Davy by tact and good sense kept him from feeling his position, but not so Lady Davy—"her temper makes it oftentimes go wrong with me, with herself, and with Sir H." "I found her extremely earnest in mortifying me." He was frequently on the point of resigning and returning home alone, but he solaced the injury inflicted on his dignity by reflecting on the accompanying scientific advantages. He thus unbosoms himself to his friend Abbott:—

> "I have several times been more than half decided to return hastily home, but second thoughts have still induced me to try what the future may produce, and now I am only retained by the wish of improvement. I have learned just enough to perceive my ignorance, and, ashamed of my defects in everything, I wish to seize the opportunity of remedying them. The little knowledge I have gained in languages makes me wish to know more of them, and the little I have seen of men and manners is just enough to make me desirous of seeing more. Added to which, the glorious opportunity I enjoy of improving in the knowledge of chemistry and the sciences continually determines me to finish this voyage with Sir Humphrey Davy." (I. 74).

In May, 1815, we find Faraday again in the laboratory of the Royal Institution, the only difference being the increase of his weekly wage to 30s. He is now entering on what his biographer calls the "Period of his earlier

Scientific Education" (1815-1819, to aet. 28). During this period Davy's researches on fire-damp and flame produced their fruit—the "Davy lamp." While enjoying the advantage of participating in these researches, the assistant profited also by the defects of his master—his want of self-control and of method. Faraday has been known to say that the greatest of all his great advantages was that he had a model to teach him what he should avoid. During this period he began his career as a lecturer, by delivering a series of seven lectures to the City Philosophical Society. His subjects were chemical, and were introduced by a statement of his opinions regarding the unity, nature, and relationships of matter and force, topics to which he is ever afterwards constantly recurring. The thoroughness with which he went about everything he put his hand to is illustrated by his elaborate notes of a course of lectures on oratory, by attending which he endeavoured to improve himself in the art of speaking. He also published his first scientific paper, an Analysis of native Caustic Lime, in the "Quarterly Journal of Science," which he even had the honour of conducting during its editor's temporary absence from London. Thirty years afterwards, he appended this note to the reprint of this paper, with others, in a volume. "Sir Humphrey Davy gave me the analysis to make as a first attempt in chemistry, at a time when my fear was greater than my confidence, and both far greater than my knowledge; at a time, also, when I had no thought of ever writing an original paper on science." His humility kept him from feeling the stirrings of greatness within him. Henceforth every year produced its "original papers." Faraday's Common-place Book begins now, and is of interest to us chiefly as a part of his method of enquiry. It is full of interrogative notes of doubtful subjects to be elucidated, of probable explanations of phenomena to be verified or disproved. He was in the habit of drawing his pen through each entry as it was finally disposed of, writing opposite it "answered." One of his continental introductions ripened already into a correspondence, which, beginning with the father, continued with the son, and lasted nearly fifty years. Some of the most valuable and beautiful of Faraday's letters were written to the De la Rives. Davy also writes to him from abroad more as a fellow-labourer than as his assistant.

Altogether Faraday had fairly entered on his career as a philosopher. As illustrations of the spirit and method of his working at this period we have marked some passages for quotation. In one of his lectures to the City Philosophical Society he gave the following estimate of the value of opinions and picture of the true philosopher :—

Caution in forming opinions.—"Man always forms opinions, and he always believes them correct. In pointing out the errors of another, he endeavours to substitute for them his own views. At the present day we have our theories and laws, and we believe them to be correct, though they may probably fall, as others have done before them. 'Tis true that, warned by the example of others, we profess to be more reserved in our opinions, and more guarded in our decisions; and yet continual experience shows that our care applies rather to former errors than to those now likely to arise. We avoid those faults which we perceive, but we still fall into others. To guard against these requires a large proportion of mental humility, submission, and independence."

Who is a philosopher?—"The philosopher should be a man willing to listen to every suggestion, but determined to judge for himself. He should not be biassed by appearances, have no favourite hypothesis, be of no school, and in doctrine have no master. He should not be a respecter of persons, but of things. Truth should be his primary object. If to these qualities be added industry, he may indeed hope to walk within the veil of the temple of nature." (I. 197).

Another lecture was entitled "Observations on the Inertia of the Human Mind," and is remarkable for its elegance, originality, and vigour of thought. It is well worthy of attentive perusal. This part of Faraday's life is peculiarly rich in statements of general principles such as the above quotation. His mind was evidently much engaged in clearly formulating those principles for his future guidance,—in fixing warning beacons over the rocks and shoals which often make shipwreck of science. The following passages also occur in his lectures :—

Inducements to form opinions on insufficient data.—"The disagreeable and uneasy sensation produced by incertitude will always induce a man to sacrifice a slight degree of probability to the pleasure and ease of resting on a decided opinion; and where the evidence of a thing is not quite perfect, the deficiency will be easily supplied by desire and imagination. The efforts a man makes to obtain a knowledge of nature's secrets merit, he thinks, their object for their reward; and though he may, and in many cases must, fail of obtaining his desire, he seldom thinks himself unsuccessful, but substitutes the whisperings of his own fancy for the revelations of the goddess. Thus the love a man has for his own opinion, his readiness to form it on uncertain grounds rather than remain in doubt, and the necessity he is under of referring to particular and individual examples in illustration of his views of nature, all tend to the production of habits of mind which are partial and warped. These habits it is which give rise to the difference of opinion in men on every possible subject. All parts of the system, both of the moral and natural world are constant in their natures, presenting the same appearances at all times and to all men. But we cannot perceive them in all their bearings and relations; we view them in different states and tempers of mind, and we hasten to decide upon them. Hence it happens, that a judgment is made for future use, which not only differs in different individuals, but, unfortunately, from truth itself." (I. 266).

Dogmatism in Science.—"Nothing is more difficult and requires more care than philosophical deduction, nor is there is anything more adverse to its accuracy than fixidity of opinion. The man who is certain he is right is almost sure to be wrong, and he has the additional misfortune of inevitably remaining so. All our theories are fixed upon uncertain data, and all of them want alteration and support. Ever since the world began, opinion has changed with the progress of things; and it is something more than absurd to suppose that we have a sure claim to perfection, or that we are in possession of the highest stretch of intellect which has or can result from human thought. Why our successors should not displace us in our opinions, as well as in our persons, it is difficult to say; it ever has been so, and from analogy would be supposed to continue so; and yet, with all this practical evidence of the fallibility of our opinions, all, and none more than philosophers, are ready to assert the real truth of their opinions." (I. 272.)

In another passage he reiterates his belief in *facts*, as the anchor of science; "Ultimately, *facts* are the only things which we are *sure* are worthy of trust." These are the opinions of the man who but a year before discharged the duties of lacquey to Sir Humphrey Davy!

The period 1820 to 1830 (to aet. 39) is that of Faraday's "Higher Scientific Education." In 1820 he read his first paper to the Royal Society, of which four years later he was elected a Fellow. Scientific honours began to flow in upon him. In all, Faraday received not less than 95 honorary titles and marks of merit. When asked in 1838, what were his titles? he answered, "One title, namely, that of F.R.S., was sought and paid for; all the rest were spontaneous offerings of kindness and good-will from the bodies named."

The critical period in the career of a man of science comes when adversity is passed, and the tide of fortune, previously at low ebb, is in full flood. Faraday was now just at the turn of the tide, and we watch, with interest, to see how he comported himself. In 1825 it was "resolved that Mr Faraday be appointed Director of the Laboratory (of the Royal Institution) under the superintendence of the Professor of Chemistry." This did not necessarily entail greater labour upon him, but the measure of Faraday's scientific work always was his opportunity and ability. He never held an honorary office; or, if in other hands an office had been honorary, he always made it one of active exertion. So he immediately instituted those Friday Evening Discourses which are still continued, and have, especially in his hands, been the means of disseminating scientific information among all classes of the community, from the Royal family downwards. Only next year the managers acknowledged his self-imposed labours by relieving him from his duty as assistant to the Professor of Chemistry, "because of his occupation in research." In 1827 he declined the offer of the Chair of Chemistry in the new University of London, because he thought the Royal Institution "a useful and valuable establishment," and he was determined "to give at least two years more to it, in the belief that after that time it will proceed well into whatever hands it may pass." But in 1829 he agreed to lecture on Chemistry at the Royal Academy, Woolwich, stipulating for £200 a-year, the duties not detaching him from the Institution. The manner in which Faraday dealt with the question of remuneration on this and other occasions is worthy of attention. In his letter to Colonel Drummond accepting the proffered appointment, he enters into it in a way which the man of the world would call "unbusiness-like." He advances to his conclusion as methodically from point to point as if working out a laboratory experiment. For the Institution lectures he received, "independent of my salary as an officer of the establishment, £8 15s per lecture," and with this had an assistant and every appliance conveniently at hand. The only lectures out of the Institution which he had undertaken had been paid at the same rate, with the same collateral conveniences. It is impossible "to do justice to the subject in less than twenty lectures, which would amount to £175. . . . Notwithstanding I still feel the difficulty of estimating labour, the extent of which I am ignorant of," meaning the extent of illustrative experiment and of consequent occupation of time in preparation. Finally, "if you would make the offer £200 a-year, I would undertake them. . . . I have no thought the sum would overpay," because he had found the proportion of instruction in chemical lectures tended to "expand rather than contract." Then comes an apology for deciding on pecuniary grounds at all! "I should have been glad to have accepted or declined it, independent of pecuniary motives; but my time is my only estate, and that which would be occupied in the duty of the situation must be taken from what otherwise would be given to professional business." (I. 369). Faraday's "salary as an officer of the establishment" was £100; his fixed income, therefore, would be about £300 before this appointment.

Comparing past achievements with those to come, Faraday's scientific life was only now (1831) beginning. "If," says his biographer, "it had ended at this time, when he finished his higher education, it might well have been called a noble success." If the reader will refer to his Life (I. 384) he will find a recital of work done comprised in no fewer than 60 important papers. But he had still a quarter of a century before him which he made lustrous with those "Experimental Researches in Electricity," which constitute his greatest work. It does not come within the scope of this study of Faraday's scientific life to refer more particularly to those discoveries. We must still endeavour to exhibit the spirit of devotion to science for its own sake which now, as always, regulated the conduct of his life. The phrase, "professional business," will have been remarked in the extract from Faraday's letter to Colonel Drummond. This meant commercial work, analyses, and the like. It was at this period, shortly after his magneto-electric discoveries had made his name famous, that the question, "Wealth *versus* Science" presented itself. Had he chosen to abandon or cripple his researches, engage assistants, and, as the manner of some is, give up his laboratory to "professional business," he might have made an unlimited income and amassed a fortune. Dr Tyndall had the curiosity to examine his accounts, and this is how Faraday decided the question. In 1831 his professional business income was £1090 4s., in 1832 it was £155 9s., and it dwindled in six years to nothing, where it almost uniformly remained. "Taking the duration of his life into account, this son of a blacksmith and apprentice to a bookbinder, had to decide between a fortune of £150,000, on the one side, and his undowered science on the other. He chose the latter and died a poor man." *

We have already pointed out how Faraday transformed an honorary office into one of earnest labour. In 1834 he was appointed Fullerian Professor of Chemistry for life, with a salary of about £100 a-year. He was the first occupant of the Chair. He was specially exempted from lecturing, but in concluding an ordinary Friday discourse shortly after, on the action of spongy platinum on gases, he said, "In submitting this theory to your attention as the result of experiment conducted in your Laboratory, I wish to show that I have not lightly prized or *indolently reposed under* the favour you have conferred on me by appointing me Fullerian Professor in this Institution." (II. 44). Would that all professors, whether Fullerian or other, were of the same mind as Faraday. "Issachar saw that rest was good, and the land that it was pleasant," may be said of many a man from the day he becomes a professor. A professor's chair, if moderately endowed, should be an elevation above the dire necessity which compels to "professional business." It is too often made a means of personal aggrandisement, or what is perhaps worse, a "Lotos-land," where there is a negation of all former activities. Faraday repeatedly, in the course of his life exhibited this self-denial and determination not to be lulled by honours into idleness. In 1835 he declined a pension from Government. "He thought that scientific men are not wrong in accepting pensions, but still he might not take a pay which is not for service performed while he was able to live by his labours." By the advice of his father-in-law, he withdrew this declinature, but during an interview with Lord Melbourne, his lordship inadvertently disparaged such pensions, and Faraday on his return home, for he never acted on a mere impulse, wrote a short, dignified note, declining to "accept at his lordship's hands that which, though it has the form of approbation, is of the character which your lordship so pithily applied to it." It is believed that "humbug" was the word used, and certainly nothing was more foreign to Faraday's nature than "humbug" of any sort. The affair caused a great talk at the time, but his lordship satisfied the sensitive philosopher that no harm was meant, and ultimately he accepted the pension. In 1836 the Trinity House desired his services as scientific adviser. He regarded the request in his usual way, starting from a consideration of the duties involved and his ability to perform them. It must not be "periodical routine attendances," but if it be testings, consultations, &c., in short, *work* which could be done, "with an honest sense of a duty to be performed," then he would accept it, and "the sum of £200 was quite enough in itself, but not if it is to be the indicator of the character of the appointment." Then comes a very characteristic reflection. "The thought occurs to me, whether, after all, you want such a person as myself. This you must judge of; but *I always entertain a fear of taking an office in which I may be of no use to those who engage me.*" (II. 91). He held the post for 30 years, and has left several portfolios full of MSS. connected with its business, besides the magneto-electric lighthouses which, wherever they flash over the dangers of our shores, testify that Faraday's salary of £200 a-year certainly was no "indicator of the character of the appointment."

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* *Faraday as a Discoverer.* By John Tyndall, p. 156.

The same rigorous conscience which ruled his decisions in the acceptance of office, led Faraday to resign when, from want of time, or later in life, from increasing infirmities, he could no longer discharge the duty as he desired. Hence he never presented the spectacle sometimes witnessed of a plurality of offices beyond the power of one man to hold with credit, or of senility retaining office to the injury of the cause which the office was intended to advance. Very early in his career he also declined all dining out or invitations. In 1861 he resigned the "Juvenile Lectures," and placed his entire duties at the disposal of the managers, in a letter which no one could imagine was written by the greatest philosopher of the day to the managers of an Institution which had been made famous by his discoveries, and whose coffers he had replenished by his lectures. He says—"During forty-nine years I have been most happy in your kindness, and in the fostering care which the Royal Institution has bestowed on me. Thank God, first, for all His gifts. I have next to thank you and your predecessors for the unswerving encouragement and support which you have given me during that period. My life has been a happy one, and all I desired. During its progress I have tried to make a fitting return for it to the Royal Institution, and through it to science. But the progress of years (now amounting to threescore and ten) having brought forth first the period of development, and then that of maturity, have ultimately produced for me that of gentle decay." (II. 438). On the 20th June, 1862, Faraday delivered his last Friday discourse. The notes of its conclusion remain in his handwriting. As if desirous of justifying the abandonment of a duty, he advances four reasons, numbered and underlined according to their importance, and ending with the word "*Retire.*" Next year he resigned his position in the Senate of London University, because "it is one which should not be held by an inactive man to the exclusion of an active one." In 1865 his scrupulous anxiety to keep the interests of the Institution safe, led him to remind the managers of his previous letter, and again to express his wish to "retire from the position of superintendent of the house and laboratories," and he signs himself,—"Your dear, indebted, and grateful friend, M. Faraday."

We gave quotations from the earlier part of Faraday's life, to show the general principles by which he was guided. There is no lack of similar passages in his lectures, letters, and notes of experiments, during the latter part of his life, to prove not only that he kept this straight road of science to the end, but how he constantly, as it were in an audible voice, repeated the creed which he practised, like one tempted to diverge into seductive but delusive side-paths. We refer to sentences like these—"Must always work practically; never give a final opinion except on that." "Nature is our kindest friend and best critic in experimental science if we only allow her intimations to fall on unbiassed minds." "I must keep my researches really *experimental*, and not let them deserve anywhere the character of *hypothetical imaginations*." This last is from his laboratory note-book, and is a specimen of how he *thought into* that book, and recorded all his mental processes. Sometimes he would write "*Good*," "VERY GOOD EXPERIMENT," "*Very extraordinary*," at the end of a paragraph, just as the enthusiasm of the moment dictated. The following are passages from Faraday's lectures and letters:—

Against too much Assurance:—"As I begin by a warning against *speculation*, so end by a warning against too much *assurance*. What is the experience to us of past ages—all sure in their days except the most wise—yet how little remains, and are we wiser in our generation? Was earth, air, fire and water right; then salt, sulphur, and mercury; then phlogiston; then oxyacid and oxygen; now atoms? We may be *sure* of facts, but our interpretation of facts we should doubt. He is the wisest philosopher who holds his theory with some doubt; who is able to proportion his judgment and confidence to the value of the evidence set before him, taking a fact for a fact, and a supposition for a supposition; as much as possible keeping his mind free from all source of prejudice or where he cannot do this (as in the case of a theory) remembering that such a source is there." (II. 175).

Speculation and experiment:—"I think it likely that I have made many mistakes in the preceding pages, for even to myself my ideas on this point appear only as the shadow of a speculation, or as one of those impressions upon the mind which are allowable for a time as guides to thought and research. He who labours in experimental inquiries, knows how numerous these are, and how often their apparent fitness and beauty vanish before the progress and development of real natural truth." (II. 274).

The duty of a philosopher as regards belief.—"It is not the duty or place of a philosopher to dictate belief, and all hypothesis is more or less matter of belief; he has but to give his facts and his conclusions, and so much of the logic which connects the former with the latter as he may think necessary, and then to commit the whole to the scientific world for present, and, as he may sometimes without presumption believe, for future judgment." (II. 347).

Cause of hesitancy in accepting new truths.—"I believe some hesitate because they do not like to have their thoughts disturbed. When Davy discovered potassium, it annoyed persons who had just made their view of chemical science perfect; and when I discovered the magneto-electric spark, distaste of a like kind was felt towards it, even in high places." (II. 384).

Mere biography not being our aim, we have adhered strictly to the evolution of Faraday's scientific life. We have given only such glimpses of the man as were necessary to complete the picture of the philosopher. The reader will probably conclude, and rightly, that the man was at least as great and as good as the philosopher. In the whole range of scientific biography, there is no record of a life so honest, so pure, so simple, so humble from beginning to ending as that of Faraday. There is no loss of personal identity. The bookbinder is evidently the same as the philosopher, and the philosopher the same as the bookbinder. It is in his letters that we see Faraday's heart; his letters to his wife, to his nieces, to his friends, scientific and general. They abound with tender sympathy and clinging love, as well as with temperate advice in difficulty, and gently-given comfort in sorrow. But we must not suffer ourselves to be led beyond the limits of our design. Dr Jones has given, in the last pages of his last volume, an elegant summary of Faraday's character, to which the reader may refer. His niece, Miss Bernard, draws an affecting picture of the old man at Hampton Court, shattered both in mind and body, but with "the sweet, unselfish disposition, winning the love of all around him;" still finding amid the dulness of his faculties delight in such phenomena of nature as appealed to the eye, the autumn sunsets and the rainbow. Faraday died, aged 76, in his chair in his study, 25th August, 1867, in the house provided for him by the kindness of his Sovereign on Hampton Court Green.

The word "practical" is one which is often in the mouths of medical men. In criticising each other, perhaps there is no standard to which we oftener bring our brethren than that which this adjective indicates. We do not pretend to know all that is meant by the word, or whether its meaning is correctly applied, but lest some of our readers should be disposed to bring Faraday to this test, and ask, What was the "practical" result of all this experimenting? we shall hear what Tyndall has to say in reply, and also what he has to remark regarding such a question.

> "As far as electricity has been applied for medical purposes, it has been almost exclusively Faraday's electricity. You have noticed those lines of wire which cross the streets of London. It is Faraday's currents that speed from place to place through these wires. Approaching the point of Dungeness, the mariner sees an unusually brilliant light, and from the noble *phares* of La Hive the same light flashes across the sea. These are Faraday's sparks exalted by suitable machinery to sunlike splendour. At the present moment the Board of Trade and the Brethren of the Trinity House, as well as the Commissioners of Northern Lights, are contemplating the introduction of the magneto-electric light at numerous points upon our coasts; and future generations will be able to refer to those guiding stars in answer to the question, what has been the practical use of the labours of Faraday? But I would again emphatically say, that his work needs no

such justification, and that if he had allowed his vision to be disturbed by considerations regarding the practical use of his discoveries, those discoveries would never have been made by him."

We had proposed to follow up this study of the scientific life of Faraday by pointing out the lessons which it teaches (1) to the student of medicine, as to the discipline of his mind; (2) to the practitioner of medicine, on the conduct of his practice; (3) to the teachers of medical schools, as to the duties which they owe to the profession in precept and example. We must, however, rest satisfied with assuring the student, the practitioner, and the teacher of medicine, that for them Faraday's life does contain lessons which, if they are as humble as he was, they can hardly fail to discover for themselves.

II.—Hysteria: Remote causes of Disease in General; Treatment of Disease by Tonic Agency; Local or Surgical forms of Hysteria, &c. Six Lectures delivered to the Students of St Bartholomew's Hospital, 1866. *By* F. C. Skey, C.B., F.R.S. Third Edition. Longmans, Green, Reader & Dyer. London, 1870.

That congestion is not inflammation, that nervous disease may stimulate inflammatory affections, that such counterfeits are commoner than the real diseases, and that the treatment of such cases ought to be by tonics instead of antiphlogistics —such are the main propositions in these lectures.

Mr Skey urges the liberal use of alcohol—the amount to be regulated according to its influence on each individual patient; he contends "that the quantity consumed with impunity, be it large or small, is the gauge of its want by the system of that person." He denounces the routine treatment of disease by means of purgatives and mercury, and ridicules the alleged frequency and importance of congestion of the liver,—"A term in the mouths of nine-tenths of the profession practising medicine and surgery in the dominions of Her Majesty the Queen."

Mr Skey may be presumed to be familiar with the notions current among the students, to whom these lectures were addressed in 1866; but in some other schools such earnest warning against depletion and mercury would have appeared almost unnecessary. Indeed, we suspect that the chief danger among many of those now being educated is rather in the opposite direction of ordering and continuing the use of alcohol, unthinkingly, in all forms of disease and weakness.

The lecturer directs attention to the frequency of hysterical affections of the joints and spine, to various spasmodic affections of the muscles, and to certain forms of paralysis due to mental influences.

The following extract expresses Mr Skey's opinion on a subject which has lately come prominently under the consideration of the general public as well as of the medical profession. Mr Skey does not believe in the danger of admitting air into the pleural cavity when performing thoracentesis.

> "I punctured the chest and got away six pints of serous fluid; the cavity thus made was entirely occupied by atmospheric air, to the admission of which I have never yet ascertained the grounds of objection, or seen any injurious result therefrom. I have done this operation often, and have never considered it desirable to exclude the air from the cavity within. Though irrelevant to my subject, I cannot forbear asking the simple question,—'What is supposed to occupy the space from which the fluid has been removed?' Certainly the lung will not immediately expand, and the walls will not collapse for a period of weeks or months." P. 33.

The style of these lectures is throughout very forcible, and is well calculated to arrest the attention of the reader.

III.—LUNACY: ITS PAST AND ITS PRESENT. *By* ROBERT GARDNER HILL, F.S.A. pp. 109. London: Longmans, Green, Reader & Dyer. 1870.

IN this work Mr Hill lays claim to the entire credit of being the originator of the non-restraint system of treating the insane. On this point he desires to be considered "aut Cæsar aut nullus." It is certainly somewhat curious, considering that it is only between thirty and forty years since this mode of treatment was introduced into asylums, that there should have existed so much misconception as to its author. There can be no doubt that, more especially in foreign countries, the high honour is generally ascribed to the late Dr Connolly, yet Connolly himself never laid claim to it. On the contrary, he distinctly states in his work "On the Treatment of the Insane," (page 178), that it was in consequence of his observation of its successful application in the Lincoln Asylum, at the time that Mr Hill was house-surgeon there, that he became convinced that "mechanical restraints might be safely and advantageously abolished in an asylum of any size." But though not its author, Connolly must still be regarded as its great exponent, for he it was who first demonstrated on the largest scale that the insane could be best treated by the complete disuse of all forms of restraint to the person. But it is not so much of Connolly as of the late Dr Charlesworth, the visiting physician to the Lincoln Asylum when he was house-surgeon, that Mr Hill feels jealous. Their relative position appears to be this:—Dr Charlesworth did much to advance that great work of reform in lunatic asylums which had been initiated at the end of last century by William Tuke in this country and Pinel in France—a reformation, however, which had advanced only a little way in the interval. He put aside some of the more objectionable instruments of coercion, and much restricted the use of those that were continued; but the idea of their entire disuse does not seem to have occurred to him. Mr Hill entered with enthusiasm into this work along with Dr Charlesworth, but went further: he demonstrated that mechanical restraint was unnecessary in the treatment of even the acute and dangerous forms of insanity, and may therefore fairly claim to have been the first who *altogether* abolished restraint to the person in the management of the insane. But justice requires that we award to Dr Charlesworth his meed of praise. Their names in fact should both be associated with the movement; each is entitled to his own share of the honour—Mr Hill, however, being in our estimation the greater. The city of Lincoln itself may be proud that through these gentlemen their institution should have led the way in banishing those frightful cruelties and abuses which then abounded in asylums.

The non-restraint system was a decided improvement in the treatment of lunatics. We trust the next great reform will be the liberation of a considerable proportion of the inmates of asylums, such as are in no-wise dangerous nor offensive to public decency, under a proper scheme of "boarding out." If this were done generally throughout the country, the patients themselves would return to a more natural mode of life, and we might anticipate that the steady and serious increase of public expenditure on account of pauper lunatics would be checked.

IV.—TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF LONDON. Vol. XI. For the Year 1869. pp. 346. London: Longmans, Green, & Co. 1870.

THE causes of infant mortality are treated of in this volume. A committee of investigation report to the society the results of information obtained from medical men throughout the country. This information has been by no means so ample or satisfactory as might have been wished, yet from it we learn that a lessened infant mortality is to be sought, on the one hand, by an improved hygiene, and on the other by a reform in the law of the land respecting infants, more especially illegitimates. The following are the most important of the facts and opinions elicited. A large number of women fail to suckle their children properly, through a deficient secretion of milk. Illegitimate children among the poor are rarely suckled at all. The substitutes for the mother's milk are carelessly prepared and unadapted to the age of the child. The want of ventilation in crowded sleeping rooms tells very prejudicially on infants, though they may be much in the open air during the day, in charge of children little older than themselves. The infants' clothes are too soon shortened, and that irrespective of the season of the year. The average dress, especially in winter, is not sufficient; internal congestions and many consequent diseases are traceable to this source. Sleep is encourged to the utmost, the infant being then least troublesome to its attendant; its waking is taken as an indication for food; should this fail in securing renewed sleep, cordials and narcotics are resorted to. On this last point there is confirmatory testimony from nearly every quarter, the chief exception being the agricultural villages. Deliberate neglect to call in medical advice in infantile complaints, until such advice is fruitless, widely prevails. Direct ill-treatment of infants is not very common, while their exposure to such malign influences as those above referred to is very common indeed. And this exposure is to a great extent intentional, springing from the basest selfish motives, and not, as might be supposed, the mere result of ignorance, or carelessness, or poverty. The law at present takes too little cognizance of this subject as it bears on the community generally, and hence the habitually vicious take shelter under its lax provisions. Among the suggestions, by way of remedy, made from different quarters, are these:—The registration of all births of children who have passed the sixth month of pregnancy and whether born alive or dead. Dietaries for children, printed by authority, and widely distributed throughout the country. The registration and supervision of all persons who receive children to nurse. Inquests held more frequently on the death of infants. Act to render illegal, in the case of infants, the present system of insuring to profit by death. On the other hand, that Government might establish an insurance office in which the lives of children may be insured soon after birth, the assurer to receive the benefit, not on the child's death but on its reaching a certain age to be fixed. The fathers of illegitimate children should be compelled to make suitable provision for them, on an ampler scale than at present. And we might perhaps be allowed to add, that the mother's fall should not be visited by so great social severity as it now is—a severity that is accountable for many a suicide and many more infanticides.

The President of the Society, Dr John Hall Davis, in his annual address pays a full tribute of respect to the memory of the late Professor Pagan, who was an honorary fellow.

Dr Davis contributes a long paper on puerperal convulsions, illustrated by 35 cases. He considers many examples of eclampsia parturientum more nearly allied to apoplexy than to epilepsy, hence in severe cases of the sthenic type he bleeds freely at the arm, or gives nauseating doses of tartar emetic, or uses other depleting measures according to circumstances. While in asthenic cases blood-letting is contra-indicated, and the inhalation of chloroform is resorted to as the principal remedy, the bowels relieved by purgative enemata, and the bladder by catheter, and perhaps mustard applied over kidneys and on inner aspect of thighs. At the date of Dr Davis' earlier cases chloroform was not introduced, else it had probably taken the place of blood-letting in several instances. Its action seems to be to produce a temporary diabetes, and by the sugar thus formed to prevent the non-eliminated urea being changed into carbonate of ammonia. For full information on uræmia as a cause of puerperal eclampsia, Dr Davis directs attention to the monograph of Professor Carl Braun, of Vienna, as translated by Dr Matthews Duncan. He does not fail to refer to other causes of convulsions at the time of parturition, and each cause may give a character of its own to the eclampsia *e.g.* febrile poisons in the blood irritating the nervous centres —putrescent matters absorbed from the uterus—bile circulating in the blood—active congestion of the brain and spinal marrow, as a centric cause, (suggesting blood-letting). Similar congestion caused by mental emotion. Reflex action from irritation of uterus, ovaries, and other viscera (hence the usefulness of anæsthetics). Primiparæ furnish about two-thirds of the cases of eclampsia, and that probably on account of the unimpaired tonicity of their abdominal walls whereby the gravid uterus is strongly pressed against the kidneys. And most of these primiparæ are unmarried, which fact would tend to show how much a distressed mind acting on the nervous centres aids the uræmic poison in the production of this alarming malady.

Dr Selby Norton contributes a spirited paper on teething. He is of opinion that most of the disorders usually ascribed to teething really arise from feeding children so much on starchy aliment. He maintains that starch cannot be acted on by infants' saliva, and that it passes undigested through the alimentary canal. His words are:—"The consequence is, that the mass of the starch passes through the alimentary canal in an insoluble and therefore indigestible form, scraping and scratching along the delicate sensitive bowels." Now, in the first place, is it quite certain that no saliva accompanies the starchy food to the stomach? secondly,—Has the pancreatic secretion no influence? and lastly,—Is that which is so often used as a demulcent to tender mucous membranes likely to possess the scraping and scratching properties here so energetically ascribed to it? No doubt good cows' milk, with warm water added, is, generally speaking, the most available substitute for mothers' milk, yet in many cases, positive good effects are produced by the occasional use of bread jelly, and other carefully made farinaceous and amylaceous aliment. The over-distension and vomiting of infancy are often counteracted by this method. Dr Norton's paper, though so uncompromising, certainly draws attention to two points which are becoming gradually more clear to the profession: First, that dentition has too many ailments laid to its charge; and Second, that too much solid food is given to infants.

There are several other important papers in this volume, more especially illustrative of general obstetrics and operative procedure which deserve special attention.

V.—NOTES ON THE TREATMENT OF SKIN DISEASES. *By* ROBERT LIVEING, A.M., M.D., Cantab, *Demonstrator on Diseases of the Skin and Assistant-Physician to Middlesex Hospital.* London: Longmans, Green, & Co. 1870.

THIS is a little book about one-third of the size of Thomson's *Conspectus.* The notes were originally prepared for Dr Liveing's students, and "consist of a few general remarks on the Etiology, Diagnosis, Treatment, and Classification of Skin Diseases, followed by some short sketches on the nature, history, and best modes of dealing with ordinary cutaneous affections. To this is added a Glossary of Terms in common use, and numerous formulæ." This is certainly much in little, and happily the little is very good. We have no great liking for handbooks and compends, as being destructive of attention to general principles; but this objection holds perhaps less in the case of diseases of the skin than of other departments of medicine. One loses all hope of finding a principle when it is thought necessary to give special and distinct directions for treatment, local and constitutional, in Eczema, Acute, Subacute, and Chronic, in Eczema of the Legs, Scrotum or Labia, Mamma, Hands and Feet, and E. Intertrigo; and for each of five different varieties which Eczema may assume, wherever, and to whatever extent it occurs. But this is the fault of the subject, it may be of nature herself in creating such variety and not of Dr Liveing. We are not aware of any book on Skin-diseases which is so brief and so full of information; and we are sure that it will be a useful addition to the equipment of the consulting-room and the study-table.

VI.—HANDBUCH DER PHYSIOLOGISCH- UND PATHOLOGISCH- CHEMISCHEN ANALYSE, FUER AERZTE UND STUDIRENDE. *Von* FELIX HOPPE-SEYLER. Third Edition. Berlin, 1870.

HANDBOOK OF PHYSIOLOGICAL AND PATHOLOGICAL CHEMICAL ANALYSIS, FOR PHYSICIANS AND STUDENTS. *By* FELIX HOPPE-SEYLER.

THE comparatively small number of men who make a special study of physiological chemistry and the consequent limited extent of its literature, is an indication of the difficulties which surround the investigation of the proximate principles of the body. In this country there is no recent work upon animal chemistry as a whole, and—if we exclude the monographs upon urine—there is, as far as we remember, no treatise at all upon physiological chemical analysis. Even on the continent, where much greater activity in this department is displayed, the number of books is small, not more than half-a-dozen being in circulation. One of the most important, and, certainly, the most recent work on the subject, is the valuable "Handbook" of Dr Hoppe-Seyler, of which we have just compared the third edition with its predecessor. To those of our readers who are not acquainted with its plan, we may mention that it is divided into four parts. The first describes the operations required to be performed in experimental physiological chemistry; the second contains the list of the reagents employed; part three is occupied with a description of the substances existing as proximate constituents of the solids and fluids of the body and the methods of detecting and estimating them; while part four gives the processes for the examination of the solids and fluids themselves in order to ascertain the substances they contain both in their normal and pathological states.

In the present edition the great bulk of the treatise remains practically unaltered, but some additions have been made to Part III., consisting of descriptions of substances discovered during the last four or five years. The most important of these are the paragraphs upon lecithin, a phospho-nitrogenized substance found in the cell fluids of plants and in almost all the animal fluids; upon cerebrin, a light white hygroscopic powder, got by treating brain beaten to pulp with cold alcohol and ether successively, then with hot alcohol which takes up cerebrin along with some lecithin, from which it is purified by boiling with baric hydrate, precipitating the barium and extracting the cerebrin with hot alcohol; and upon lutein, the colouring matter of the yolk. It has been found necessary also to rewrite some of the sections, more particularly upon cholin, neurin, oxyneurin and sinkalin, upon the albumens, and upon the colouring matters in bile and in blood. Reference is made under the last to the recent researches of Städeler and Thudichum upon the former and of Preyer upon the latter. There are several other minor improvements and additions, among which may be mentioned the adoption of the new combining weights and references to the papers of the different authors quoted.

We could wish the subject of animal chemistry would begin to attract such attention in this country, that before long it would be found necessary to add to English chemical literature a work similar to the present, for the use of medical students and practitioners.

It may be noticed, in conclusion, that in external appearance this third edition is much more attractive than the last.

VII.—REPORTS ON THE PROGRESS OF PRACTICAL AND SCIENTIFIC MEDICINE IN DIFFERENT PARTS OF THE WORLD. *Edited by* HORACE DOBELL, M.D., assisted by numerous and distinguished coadjutors. London: Longmans, Green, Reader & Dyer. 1870. pp. 645.

"THE design of the work is to bring together in the English language original and independent reports from all parts of the world, written by distinguished men resident in the countries which they represent." Such a design is one that must meet with the approbation of many; every one, however, must admit that the difficulties which present themselves in carrying it out are really stupendous. The present volume professes to report on the progress of medicine from June 1st, 1868, till June 1st, 1869. There are 31 articles arranged alphabetically. Several of these are divided and sub-divided. The series begins with "Africa," and ends with "United Kingdom." In addition to the names of places, there are articles on "Climate," "Experiments (projected)," "Food," "Hospitals," "Mechanical Appliances," "Sulpho-Carbolates," as well as on "Cider-Colic," "Consumption," and other diseases. The alphabetical arrangement gives a singular aspect to the book which we cannot admire, even although we are told that it has been adopted "to facilitate reference, and avoid questions of precedence."

It would be wrong to judge the first volume of such a difficult undertaking too strictly, but the reports scarcely seem to come up to the design announced. The reports for France by M. Villemin (84 pages), for Denmark and Sweden by Dr Rasmussen (25 pages), for Iceland by Dr Hjaltelin (16 pages), may indeed be taken as fulfilling the conditions announced in the prospectus,—although we doubt the ability of any one man, however distinguished, to report fairly on all the branches of medicine, surgery, and midwifery. The report for Germany (30 pages) is written by Dr Althaus of London, and not by a resident in the country which he represents. Too many of the other reports are little else than letters of apology, or are so brief as to have but little value.

Perhaps the fairest way of testing the value of such a volume as the present is to select the reports on such a disease as pneumonia, which is supposed by many to vary according to climate and circumstance. This test is the fairer as the editor seems to invite such a comparison. We extract seven reports on this disease, that the reader may judge for himself how far new light may be expected from this method. We regret to see that of the seven extracts here given, only three are referred to in the index under "Pneumonia." A large part of the value of such a work as the present depends on the completeness of its index.

Biarritz. Dr C. E. Chapman.— . . "So at Biarritz, during at least nine months out of the year, inflammatory diseases invariably run a quick and violent course,—in fact, are acute. . . In the crucial disease of pneumonia, in regard to this point, I can speak positively, and I have never failed to cure by leeches, blistering, poulticing, antimony, low diet, &c.:

whilst other treatment here is, to say the least, highly dangerous, this is most sure and safe. I have never seen a death from exhaustion from pure inflammatory disease at Biarritz; and, on the other hand, recovery is invariably rapid after such maladies, however depletive the treatment may have been." P. 33.

Denmark. Dr Rasmussen.—"At the Royal Fredericshospital, clinical division, (Professor With,) croupous pneumonia is treated in the first stage in all patients, where no contra-indications appear, and the pulse is very quick, with infusum digitalis (fol. grm. 2, aquæ grm. 200): if the pain is considerable, local blood-letting, usually cupping, is employed. Venesection is in very few cases resorted to, and only when the pulse is very full and there is dyspnœa and cyanosis (generally in double pneumonia). The affected side is enveloped in bandages steeped in water and covered with india-rubber: the bandages are changed every morning and evening. This treatment is continued during the progress of the disease; but towards its conclusion wadding is used in the bandages. In the evening, morphia or tincture of opium is given to the patient, and exceptionally, when the pain is very violent, sub-cutaneous injection of morphia is applied. At the second and third stages ipecacuanha is given. . . . Slight cases are sometimes treated with infus. pector. and bandages steeped in water. To cachectic individuals, especially when there is diarrhœa, and to old people, acetat. chinæ et acetat. plumb. āā. 5 ctgm. are given in wine and spirits, (never, however, in Todd's fashion,) æther and invigorating diet. Treatment with veratrin has not given any good results; but it has not been thoroughly tried, as physicians have been deterred from using it on account of the violent and, for the patient, exhausting vomitings. In a few cases where the pain was considerable, and other means had not the desired effect, ice bandages or ice bags have proved to be of good use." Pp. 92, 93.

Iceland. Dr Hjaltelin.—"The few cases of pneumonia which, during this epidemy, came under my care were treated by cold epithemata all round the chest, which seemed to do a great deal of good; internally, quinine was administered either alone or in combination with acetate of lead; and the tedious and long-lasting cough was successfully treated with cocleia [codeia?] given internally at bed-time. In some of the most malignant cases calomel was given internally in combination with opium, or quinine, according to the severity of the case and other complications, and, as it seemed, very often with good effect." P. 285.

Newfoundland. Dr William Anderson.—"Pneumonia is rare, and not, in my experience, of a fatal tendency. It is neither asthenic in type nor decidedly sthenic, but moderate." Pp. 368-69.

Paraguay. Mr F. Masterman.—"Pulmonary affections were of frequent occurrence,—pleuro-pneumonia especially so. They required pretty constantly the active administration of stimulants and beef-tea: this is indeed the key-note in medical practice there; but, except in the military hospitals during the war, the mortality was not high. In one case of pleuro-pneumonia—the patient was my chief assistant, but I did not see him until he was apparently dying—the excessive but weak action of the heart seemed to occasion him the greatest distress, and as death appeared to be imminent, and he was in a very exhausted state, I gave him three drachms of tinct. digitalis (P. L.) in a single dose, with half-a-tumbler of *vino carbon*—a strong, rough wine. The result was a speedy improvement in the pulse, and a calm sleep of four hours' duration. He made a very good recovery." P. 384.

Portugal. Dr Brandt.—The old treatment of acute disease is still, with few exceptions, the favourite practice. Starving, bleeding, blistering, and lowering medicines. Tartar emetic in pneumonia and other inflam-

matory diseases of the chest, is still much in vogue, not omitting the huge pots of decotions, infusions, and tisanes of all kinds." P. 409.

***Prince Edward's Island. Dr Hobkirk.*—" There is one remarkable fact connected with the treatment of acute inflammatory disorders, that is, that depletory measures are extremely ill borne, particularly when these diseases are prevalent during the autumn and spring months. In pneumonia the tartar emetic treatment can only be pursued for a limited time, and we are obliged to have early recourse to cordials, and this rule, it may be said, is applied to most acute inflammatory affections." P. 416.**

In addition to the reports from other parts of the world, there is one also for the United Kingdom. It extends to 183 pages, and is sub-divided into various sections. That on materia medica and therapeutics, from the number of its references, seems to be of much value, but as these references are in large part to foreign journals, it is hard to understand in what sense it should be regarded as a report on the progress of therapeutics *in this country*. Indeed this consideration raises the whole question of the value of the method attempted in this volume. Communication between the various scientific centres is now so extensive and rapid, that the advancement of a given department of knowledge in one country can scarcely be regarded independently of foreign labours. No doubt the points of view from which medical science is regarded in different countries are very diverse, and this makes us anxious to see our own work, and the work of others, from various standpoints. This is, perhaps, best accomplished by consulting the different year-books and reports published in other countries; each country naturally gives its own literature the predominance in such publications, but the influence of other nations may be estimated by the notice bestowed on their works. To have in one volume a view such as would result from the perusal of many reports in many languages is, no doubt, a worthy object of ambition, and if Dr Dobell can in future volumes present us with such, our obligation to him will be great. The present volume, however, seems rather to indicate the difficulties of the task than the manner of accomplishing it.

Clinical Record.

I.—TWO CASES PRESENTING ANOMALOUS NERVOUS SYMPTOMS, BENEFITED BY THE ADMINISTRATION OF IRON.

Reported by ALEXANDER LINDSAY, M.D., *Physician to the Royal Infirmary Dispensary.*

CASE 1.—J. B., pastry baker, aged 46, married, consulted me about the beginning of September, 1869. He was suffering from symptoms of dyspepsia; with an ill-defined feeling of discomfort referred to the back, the nature of which he could not well describe. Generally he felt weak and out of sorts. His appetite was but little impaired. The tongue pale but clean. Bowels regular, skin cool, and pulse quiet. Previous to this had always enjoyed excellent health. For some weeks by past had been subjected to a considerable amount of mental worry and anxiety.

He was ordered an alterative dose of grey powder and soda, to be taken at bedtime, followed by a laxative in the morning. The diet to be light, varied, and somewhat limited in quantity.

After several days I again saw him, and found that the medicine had acted, but that there was little or no improvement. I advised complete cessation from business, and sent him to the coast. After having spent ten days there he again called to say he was much worse. His dyspeptic symptoms had disappeared, but now he complained of pain and numbness of the fore-arms, hands, and feet. Though quite able to move about he was advised to keep his room and to have brisk friction along the course of the spine once or twice daily.

Three days after, viz., on the 21st of September, I called, in consequence of a message, and found him pacing up and down the room, his features relaxed, his looks anxious and depressed. For the past twenty-four hours he had suffered from intense, dull, deep-seated pain of the fore-arms and hands, with numbness. The fingers of both hands were slightly flexed. They were easily moved, this causing no increase of the pain. The same with the elbow or wrist joint, or pressure made over the fore-arms or hands. He could not grasp an object firmly from a want of muscular power. There was no perceptible swelling of the joints. There was no headache, the intellect was clear and remained so throughout his illness. The bowels had not been moved for two days. Tongue moist but slightly furred. Pulse 80. Firm pressure and percussion over the spine produced no sign of tenderness. The chest also was normal. No subjective symptoms were present which pointed to disease of any portion of the thoracic contents. The urine was free from albumen, and was otherwise norma

To have half a drop of croton oil with sugar every eight hours, till bowels were freely moved, with small mustard poultices at intervals applied to the nape of the neck, and upper part of back.

To give daily details of the progress of the case, would be tedious and useless, being a mere record of uniform suffering patiently borne. Suffice it to say that the treatment advised gave no relief. Anodyne liniments were also applied to the arms and hands with no obvious good result. In his distress he had caused cold water to be poured on one hand, but this increased the pain so as nearly for a time to drive him, as he said, mad. On the whole hot fomentations seemed to have a slightly soothing effect, and were kept constantly applied. One evening, without advice, he took a half teaspoonful of laudanum, which dulled the sensibility for two or three hours. Its nightly use was continued after this, the bowels being kept open by laxative pills. All this time he had never undressed, taking what rest he could on the sofa or easy chair. He could always take a little food, his strength was in this way kept up, aided by the use of a little sherry.

On the first of October, I met the late Dr Andrew Anderson, in consultation on the case. Again, a careful examination was made, but nothing was ascertained throwing light on the origin of the symptoms, or serving as a guide to a rational treatment. It was agreed to continue the nightly dose of laudanum, attend to the bowels and diet and watch the further progress of the complaint.

On the 4th October he stated that for two nights by past he had noted that about midnight the pain became for a time greatly aggravated. Prior to this no evidence of periodicity had shown itself, although special enquiry had been made. This change led to the conclusion that iron in combination with some vegetable bitter might prove useful. The following mixture was accordingly prescribed:—

℞.	Tk. Ferri Mur.,	
	Tk. Columbæ āā.,	℥i.
	Quiniæ Sulphatis,	gr. xx.
	Aq. Puræ,	℥ij.

To have a teaspoonful in water three times a day.

On the fourth day after beginning the mixture, he was free from pain for eight hours, during which time he had a sound sleep. The painless interval, curiously enough, was lengthened two hours daily. On the 12th, for twenty-four hours he had no suffering. On the 13th Oct., it returned for two hours, and finally ceased, leaving him weak and exhausted. The mixture was continued for a week, his convalescence being rapid and satisfactory. Up to this time (June) he has remained well.

Case 2.—April 4, 1870. William T., aged 40, married, stone mason, applied at the Dispensary of the Infirmary for advice. He stated that four months ago a feeling of numbness began in his hands and feet. For a month it went on increasing, but after that remained nearly stationary.

For the past three months he has been quite unfit for work, not being able to grasp and hold sufficiently firmly the implements of his trade. He complained of no pain in either the hands or feet, and nothing unusual was to be seen about them. On pinching the skin sensation seemed to be perfect. He could walk tolerably well, but spoke of the uncomfortable feeling while doing so. From his history nothing could be gleaned bearing on his ailment. Up to the period stated he had always enjoyed good health. He professed to be sober in his habits, and his appearance confirmed this, as he evidently belonged to the better class of workmen. He looked anxious. His face wanted the hue of one spending his time in the open air, and his lips had somewhat of a waxy look. He had no headache. His tongue was clean but pale. Pulse 70. He had already undergone a variety of treatment, but with no good result. The spine and chest were carefully examined, but nothing could be discovered having any relation to the symptoms. Subsequently the urine was seen and was normal.

His bowels had not been opened for several days, and I prescribed half-a-drop of croton oil every eight hours till freely purged. A small poultice of mustard to be nightly applied along the spine. The general surface of body to be well rubbed with a coarse towel when he got out of bed. To take out-door exercise every day. The diet to be varied, nutritious, and moderate in quantity.

April 9th.—The bowels had been freely moved with one dose of the oil, and had been regular since. He had carried out his other instructions without the slightest benefit. Advised to continue for another week, and report.

14th.—Neither better nor worse than when he first sought advice. He looked more anxious, and spoke despondingly as to the prospects of recovery. He was encouraged to have patience. The mixture of the muriated tincture of iron and columba was prescribed in the same dose as in previous case.

21st.—Much improved in general health, and thinks the numbness is somewhat less. Advised to continue the medicine.

28th.—Called to say he was now well, and ready to resume work.

II.—CASE OF CHOREA TREATED BY CHLORAL—ACCIDENTAL OVERDOSE—DISAPPEARANCE OF THE CHOREA.

Under the care of DR GAIRDNER.

Reported by DONALD MUNRO, M.B., *Assistant-Physician.*

ROBINA S., aged 8 years, admitted to the Royal Infirmary 21st January, 1870. Patient is at present suffering from chorea of the kind characterized by exaggerated restlessness and irregular movements, but not by complete loss of voluntary power of regulation.

She was admitted into this Hospital on 20th April of last year in much the same condition. At that time she was treated with Liq. Arsenicalis, and, after a stay of nearly three months (during which time she slowly but steadily improved), was dismissed well. On readmission she was put upon small doses of chloral (5 grs. thrice daily), which was steadily persevered in and gradually increased till the dose reached 15 grains thrice daily.

At the commencement of the treatment the chloral was given in a mixture containing 5 grains to the tablespoonful, and the increase of dose was made by giving two and then three tablespoonfuls thereof, without altering the original label on the bottle. Under this treatment she was steadily improving.

On February 25th, at the direction of Professor Gairdner, the dose was still further raised to 20 grains thrice daily, and with this change the strength of the mixture was increased, but the quantity diminished, and a new label with directions put on the bottle as follows:—

℞ Chloral Hydrat., . . ʒiv.
Aquae, ... ℥vi. solve.
Sig. A tablespoonful thrice daily in a little water.

This mixture was taken up to the ward in the evening, the night nurse then on duty being particularly charged to give none of the medicine herself, and to be sure to inform the day nurse in the morning that none of it was to be given till I came up in the morning. The night nurse forgot the latter part of her instructions, and did not inform the day nurse, who, without reading the label, measured out as before three tablespoonfuls of the mixture and administered it to the patient, thus giving *Sixty grains* instead of *Twenty grains* of Chloral. This occurred about 9 o'clock a.m., and in a few minutes after it was taken, the child, who was up and walking about the ward, complained that it was not the same medicine she had been getting before, felt herself becoming very dizzy and could not keep awake. She was put into her crib, and at 10 o'clock a.m. when seen by Dr. Robert Perry, Mr Lyon, his resident assistant, and myself, her condition was thus described:—

February 26th, 10 a.m.—The patient is fast asleep and lying on her left side. Pulse 96, firm and regular. Respirations 25, quiet and good. Pupils firmly contracted, but not to a pin-point, and quite insensible to light. No sign of wincing or sensibility on touching the ball of the eye. Eyelids closed. Skin healthy in appearance. Lips rather dry but florid. On pinching the legs the patient begins to move and gives evidence of feeling pain distinctly; she seems as if about to attempt to speak, and partially opens her eyes, during which time the pupils are seen to dilate, and instantly to become again very contracted on the eyelids being closed.

A dessert-spoonful of milk was given after trying to rouse her up. A portion of this was swallowed, and excited a fit of coughing and an apparent attempt on part of patient to resist taking any more.

10·30 a.m.—Temperature in axilla 97·5°; in rectum 98·4°.

10·50 a.m.—While patient was being undressed asked if she was getting better, and had for reply a long-drawn "Yes," such as would be given by a person disturbed in, but not roused from, a deep sleep, and not conscious what he was saying, or who was addressing him.

11·10 a.m.—Pulse 96. Respirations 24. Temperature in axilla 97·4°.

11·30 a.m.—Dr Perry returned, and at this time patient was not breathing so freely as at his first visit, nor was the pulse so good. He recommended a teaspoonful of sherry wine, which was given to but not swallowed by patient. Made use of friction over the thorax.

11·45 a.m.—Two teaspoonfuls of sherry made into negus were given cautiously and swallowed by patient, and in a few minutes afterwards she was asked if she was going to get up, when she replied, in much the same way as before, "No, Sir." Continue friction.

12 noon.—Patient breathing much more naturally. Pupils more dilated, without irritation of any part of surface, and somewhat sensible to light. Pulse 112. Respirations 24, but much more natural. Friction continued.

12·30 p.m.—Had two teaspoonfuls of wine as before.

12·45 p.m.—Pulse 112, full and good. Respirations 24, full and good. Patient able to answer questions when roused, but on being let alone immediately falls asleep again.

2 p.m.—Patient's general aspect is much better, and she is now able to speak and remain awake for a short time, but still soon falls asleep when let alone. Pulse 120. Respirations 24, but not quite regular as regards length. Pupils still more dilated. Has had a little wine.

2·30 p.m.—Passed urine freely and asked to be lifted out of bed for the purpose.

3 p.m.—Complained of headache, referring the pain to frontal region.

4·15 p.m.—Was lifted out of the crib and asked to walk a few yards, which she did, care being taken that she was not allowed to fall. She had quite the gait and appearance of a somewhat intoxicated and half-sleepy individual.

5 p.m.—Still improving. Pulse 100. Has been taking a little food. Eyes still suffused and watering.

6 p.m.—Continuing to improve. Has had a cup of tea and a little bread and fresh butter.

10·30 p.m.—Fast asleep and breathing quite naturally. Pulse, 88. Respirations, 18.

Feb. 27th, 1·45 a.m.—Patient still fast asleep and breathing quite naturally. Pulse 88. Respirations 18. Eyelids nearly closed and much congested, as are also the conjunctivæ. Pupils sensible to light of candle. The whole eye covered with a glairy film, and this seems to be collected in greater quantity in the inner canthus and is of a yellowish colour resembling purulent matter in a slight degree. Hands drawn up below the chin and arms folded. This latter condition of the arms and hands, it may be remarked, has been almost constant since patient was seen yesterday morning at the visit. Temperature in axilla after 15 minutes, 97·4°. The introduction of the thermometer caused her to throw her hands about, but did not waken her.

2·40 a.m.—Left the ward, giving instructions to the nurse to inform me of any change in condition of patient.

7 a.m.—Nurse reported the patient to be awake and well.

9·45 a.m.—Patient is found in the semi-erect position in crib, back being supported on a pillow, and when asked if she is better, replies with a smile, "Yes, sir." The pupils are somewhat but not greatly dilated, and the vessels of the conjunctivæ are still injected, but in a much less degree than at last note, and the eye otherwise has altogether recovered its natural clearness. The eyelids are still slightly congested and somewhat lived in hue. There is a little matter in the inner canthus, and patient states that her eyelids were sticking together when she awaked. The headache complained of yesterday at 3 o'clock p.m. did not leave her till after she was allowed to go to sleep, which the nurse says was about 8 o'clock p.m. Has no headache this morning. Pulse 80. Respirations 18. Tongue moist and pretty clean, but if anything slightly silvered. Urine passed, normal. Bowels regular.

10·30 a.m.—Lifted out of crib and walked perfectly steadily, all remains of her previous symptoms having vanished. Expresses herself as feeling quite well.

April 22.—Since the accidental overdose, described above, has had no return of the chorea even in the slightest degree, and is to-day sent to Convalescent Home.

[It should be added, that this was an extremely obstinate case of the disease, which had in a great degree resisted arsenic, zinc, Calabar-bean, and a variety of other treatment, on several occasions.—W. T. G.]

III.—CASE OF FLOATING KIDNEY.

Under the care of Dr M'Call Anderson.

Reported by Dr MacEwen, House Surgeon.

Mrs. W., nurse, aged 50 years, was admitted to the Royal Infirmary, December 9, 1869, on account of an attack of influenza, which speedily yielded to treatment. She spoke of a swelling on the right side of her stomach and of occasional pain in that situation when she coughed.

On examining the part indicated, a tumour was detected, which was accidentally observed by the patient about 27 years previous to admission, a few days after her fifth confinement, while adjusting her binder. Since then it has never disappeared, but has occasioned her neither pain nor annoyance of any kind.

Dr Anderson was of opinion that this was a displacement of the right kidney, for the following reasons:—Patient was a female, and the tumour was situated upon the right side of the abdomen, females being much more liable to this displacement than males, the right kidney being much more frequently displaced than the left. It lay in the most usual situation in such cases, namely, obliquely, and midway between the lower edge of the ribs and the umbilicus. Its surface was smooth, and it exhibited the shape and consistence of the normal kidney. When squeezed, a feeling of sickness and an inclination to vomit was experienced. It was not adherent to the abdominal parieties, could be moved readily in all directions, could be pushed back into right loin, and changed its position with the varying postures of the patient, in accordance with the law of gravity. Lastly, on making the patient stand erect, with the feet together, a decided depression was observed in the right loin, where the percussion sound was abnormally clear. The urine was normal.

An attempt was made to return the organ into its normal position with the aid of pads and a bandage, but these gave rise to much discomfort, and as the patient experienced no uneasiness while the kidney remained in its abnormal position, this treatment was not persevered with.

IV.—CASE OF SPINAL IRRITATION.

Under the care of Dr M'Call Anderson.

Reported by William MacEwen, M.B., C.M.

H. G., aged 42, labourer, was admitted into the Glasgow Royal Infirmary on February 18th, 1870. He complained of pain which, commencing in the lumbar region, "went in stounds" down the outside of the right thigh and leg nearly to the ankle, *i.e.*, along the course of the sciatic nerve. Two years previous he had an attack of what he called lumbago, the pain of which was aggravated on motion, especially in stooping or rising suddenly, but on that occasion the leg was not implicated. The attack of sciatica commenced two months prior to admission, the pain in the limb being much more marked than in the back. It was worst at night, and was aggravated by motion and by pressure behind the trochanter.

No history of venereal affection of any kind could be obtained, but a number of small, coppery, erythematous spots, about two to four lines in diameter, were scattered over different parts of the trunk and limbs, which had a rather suspicious appearance. There was no evidence of digestive derangement: his tongue was clean, bowels regular, skin rather muddy; pulse 82, regular and of good strength.

Dr Anderson pointed out that this was doubtless a case of sciatica, but that sciatica merely meant pain along the course of the sciatic nerve; and that it is advisable in every case to endeavour to ascertain the cause of the pain, or rather the nature of the condition of which the pain is the expression. In some cases no cause can be detected, and then the pain itself must be directly attacked, as, for example, by the subcutaneous injection of morphia.

Sciatica is sometimes the result of an injury, or due to inflammation attacking the sheath of the nerve, but there was no evidence of either of these in this case. It is sometimes a manifestation of gout or rheumatism, but the patient was apparently neither gouty nor rheumatic, nor had he any hereditary tendency thereto. It is sometimes the result of digestive derangement, but the digestive organs appeared to be in good order. It may occur in connection with gonorrhœa, in which case it must be regarded as a variety of gonorrhœal rheumatism, but the patient had no discharge from the urethra and there was no history of gonorrhœa. It is occasionally a symptom of syphilis, and in this case the dusky tint of the skin, the coppery stains, and the nocturnal exacerbations of the pain, led Dr Anderson to suppose that it might be the result of this taint.

Lastly, he pointed out that it might be a symptom of spinal irritation, in which case pain on pressure over the spine should be present. A careful examination of the spine was accordingly made, although the patient said that he had no uneasiness in that situation. On inspection no abnormality could be detected, but very decided tenderness on pressure was noted over the spinous processes of the upper lumbar vertebrae to the extent of about two inches. The tenderness was equally distinct on each side of the spine in this situation, and the pressure upon the tender part did not aggravate the sciatic pain. Dr Anderson concluded that in all probability the sciatica in this case was the result of spinal irritation,—a condition, the true nature of which has not yet been thoroughly elucidated, but which he supposes to be due either to congestion or to a low form of inflammation at the site of the spinal tenderness, and which leads to pain or some other functional derangement of the nerves having their origin at that site.

Having directed attention to the fact that counter-irritation over the site of the sciatic nerve, which had been carried out previous to the admission of the patient into Hospital, had proved ineffectual, he determined to treat the spinal tenderness in the first instance, and if this failed, to give the patient a course of iodide of potassium in case the sciatica might be syphilitic in its nature. Accordingly, six leeches were applied on two occasions over the seat of the spinal tenderness. The first application diminished the tenderness, while the second removed it almost entirely and diminished the sciatic pain. A few days afterwards a fly-blister was applied in the same situation, and by the time it had healed both the sciatic and the spinal pain had completely disappeared.

The patient was dismissed cured on the 14th of March.

V.—TWO CASES OF AVULSION OF THE SCALP.

Under the care of and reported by THOMAS GRAHAM, M.D., *Surgeon to Paisley Infirmary.*

CASE I.—M. F., aet. 13, a slight pale girl, admitted to Paisley Infirmary, 27th April, 1869. About three hours previous to admission, whilst stooping under a revolving shaft, patient's hair had been caught thereby, and the scalp torn off. On examination it was found that the hair had been cut short, the scalp replaced and fixed by a few metallic sutures. The skin was removed behind, to the level of the external occipital protuberance; on the right side, to half an inch above the ear; on the left side, to the middle of the ear, the upper half of which was torn almost as cleanly as if cut with a knife; in front, the skin was stripped from the forehead, both eyebrows, and the upper half of the upper eyelids. There was little constitutional disturbance. As the best dressing, until suppuration should be established, and with the faint hope that inosculation might save some portion of the removed tissue, the scalp was kept in its place and a dressing of strips of lint soaked in carbolic oil was applied. The patient was kept in a sitting posture as comfortable as possible, and cordials, generous diet, and calmatives administered. About ten days after admission suppuration was established, and none of the scalp had united. It was removed, and a dressing of strips of lint spread with resinous ointment applied. This dressing was agreeable to the patient's feelings and was easily removed. As soon as the granulating surface was level with the skin, an astringent lotion, sometimes of sulphate of zinc, sometimes of acetate of lead, sometimes of nitrate of silver, was used, to promote cicatrization. This process of cicatrization was very tedious and variable in its progress. When the patient was in good health and spirits the granulations became small, firm, and even, and a healing line was observed all round the ulcer. Again, whenever the patient got out of sorts, the granulations became puffy and flabby, the advancing cicatrix eroded, face and eyelids œdematous, and considerable hœmorrhage occurred at each dressing.

The patient ultimately died from exhaustion, 20th June, about two months after injury. Cicatrization had reached on the right side to the frontal protuberance, and to about one-and-a-half inches above the ear, on the left side, to a point midway between the protuberance and the orbital ridge. The stump of the left ear had quite healed but at no other point, either on the left side or behind, had cicatrization advanced above two lines. There was some traction upwards of both upper eyelids. The eyelids of the right eye could be completely closed. The upper eyelid of the left eye was slightly ectropic at the outer angle.

CASE II.—Mrs D., act. 31, a soft, flabby woman, mother of 8 children, admitted to Paisley Infirmary, 27th May, 1869. A short time previous to admission, her hair, as in the preceding case, had been caught by a revolving shaft and the scalp torn off. In this case no attempt had been made to replace the skin. On examination it was found that an irregular oval patch of the scalp had been removed, in front to the level of the frontal protuberances, behind to a point an inch below the junction of sagittal and lambdoidal sutures, and on each side, to an inch and a half above the ear. The tendinous expansion of the occipito-frontalis was also removed from a space measuring about four inches in diameter, leaving the bone perfectly bare and exposing the serrations of a considerable part of the coronal and sagittal sutures. The patient suffered slightly from shock. The wound was dressed with strips of lint spread with resinous ointment, and, as in the former case, attention was directed chiefly to the general condition of the patient.

Notwithstanding the extensive denudation of the bones of the skull, very little exfoliation ensued. Granulations sprang up very luxuriantly and within two months, all dead bony tissue had been thrown off. No piece larger than a florin was ever separated, and all the fragments were thin scales, evidently only the superficial layer of the external table. The dressings used were of various kinds and frequently changed, astringent lotions, ointments resinous and calamine, water dressing, and strapping. Strapping produced a considerable advance in cicatrization by drawing the side flaps upwards towards each other. The patient was discharged on 19th Nov., 1869, with a healing ulcer, having a cicatrix about half-an-inch in breadth all round it.

She is now (June, 1870) in moderate health, and states that she experiences considerable pain in the head whenever she attempts to stoop. The remaining portion of the hairy scalp has been stretched considerably by cicatrization. The ulcer has now been reduced to an irregular oval, six inches in greatest length and four inches in greatest breadth. Cicatricial tissue from three-fourths of an inch to one-and-a-half inches in breadth, edged with a healing line, surrounds the ulcer. The healing process is still progressing slowly.

Exchange Journals.

VIRCHOW'S ARCHIV, VOL. XLIX.

PART IV., MARCH, 1870.

CONTENTS.—XXII. Experimental studies with a view to the determination of the temperature-curves in acute poisoning, by Prof. C. Ph. Falck, Marburg (Plates XIV. and XV). XXIII. Observations on ileo-typhus [enteric fever], by Dr A. Baginsky, Seehausen. XXIV. Contribution on hooping-cough (tussis convulsiva, pertussis), by Ludwig Letzerich, Königstein in Taunus (Plate XVI., fig. 1-6). XXV. On laryngeal respiration, by Prof. B. Choynowski, Warsaw (conclusion from p. 408). XXVI. Smaller communications: (1) Is tuberculosis infectious? by Dr F. A. Hartsen; (2) Should persons with chest affections be allowed to marry? by the same; (3) Some remarks on the question raised by Dr Hartsen, as to allowing phthisical persons to marry, by Rud. Virchow; (4) *Post-mortem* appearances in pellagra, by Dr M. Fränkel, Dessau; (5) Mycosis of the lungs in the horse, by Dr O. Bollinger, Munich (Plate XVI., fig. 7-14).

XXII. This paper gives the details of a very elaborate series of experiments on dogs and rabbits. These animals were poisoned with phosphorus, strychnia, brucia, thebain, codein, morphia, nicotin, and pikrotoxin respectively, and the temperature in each case determined every half-hour. No general results are deduced.

XXIII. The author of this paper is a country practitioner, who has had the opportunity of observing an epidemic of enteric fever in a village where his practice lies. In this village the houses are generally built in the form of a square, having a court in the centre, and in the court is situated a dung-heap, the general receptacle for the excreta, animal and human, furnished by the square. To these dung-heaps he traces the epidemic, which sprang up in the warm summer of 1868, just at the time when the evaporation from the heaps was at its greatest. In some houses the stench from this source made it almost impossible to breathe. He considers that the disease was not contagious, for when several in one house took ill, it was not generally those who were immediately attending on the first victim, but frequently those who avoided contact with him, the cause being that all the inhabitants were exposed to the same poison. In his treatment of the disease he at first tried a substitute for cold baths in the form of cold compresses, but he required speedily to abandon it, as the patients were enfeebled by the treatment. Quinine in small doses was administered all through the fever, and he observed that while small doses (½ gr. to 1 gr. every two hours) produced a distinctly tonic effect, larger doses weakened the heart's action, and reduced the rate and tension of the pulse.

XXIV. The author in a previous paper asserted that diphtheritis is caused by a fungus which takes root in the larynx and trachea, and by its irritation produces the usual symptoms of the disease. In the present paper he ascribes the symptoms of hooping-cough to a similar cause, the fungus here being of course different. He found that the sputum of children with hooping-cough contains a fungus, and on planting this on pieces of bread soaked in milk, he obtained a fresh crop. Portions of this he conveyed into the trachea of rabbits by a small aperture made in the anterior wall. The wound always united by first intention, but the rabbits showed the symptoms of a disease exactly analogous to hooping-cough, and to its complications, and on killing the animals the fungus was found to have spread to the larger and smaller bronchi, and also to the lung-alveoli. He supposes that it is by means of the spores of this fungus that the disease is so infectious, and that it is on account of the great importance to life of the respiratory passages that their parasitic diseases (diphtheritis and hooping-cough) are so severe as compared with those of the skin.

XXVI. (1) and (2) The question which is made use of as the title of the former of these communications is answered by the author in the negative. He criticises a paper of Villemin, and denies the conclusion to which the latter had come, that tuberculosis is infectious. The question prefixed to the second communication leads the author to consider whether tuberculosis is hereditary, and he denies that it is so to such an extent as many assert. At the same time, even though it is hereditary, phthisical people lead as a rule no less useful and pleasant lives than others, and there can therefore be no harm in bringing into the world phthisical offspring. Moreover, he thinks that by the time the present children are grown up, our therapeutics of phthisis will have so advanced that we will be able to save many. To phthisical individuals themselves, he thinks marriage does good rather than harm, if they are judicious.

XXVI. (3) Although Virchow as editor never holds himself responsible for the opinions of the contributors, he thinks the above communication calls for more particular contradiction. In the first place, there will always be phthisicals enough who will marry against the advice of the physician, and there is therefore no need of the latter encouraging them to marry. He refers to a very talented pathological anatomist who was of a phthisical family, and resolved when young that he would never marry; but his feelings overcame his judgment and he married, but died within a year. Virchow is of opinion that marriage predisposes to tuberculosis in the sexual organs of both male and female. Again, the children of phthisical persons are nearly always delicate, if not themselves phthisical. Further, as to the improvement of our therapeutics, the direction in which this has gone and will go still further is by the separation of caseous pneumonia and bronchial ectasia from tuberculosis; but there will always remain many incurable phthisicals. His opinion is briefly contained in the advice he lately gave to two phthisical fathers, who consulted him as to whether they should let their children marry. His answer was as follows: "The young people should be informed of the whole danger to which they expose themselves, should be strongly advised against the undertaking, but left finally to their own conscience as to what they will choose."

VOL. L.

PART I., APRIL, 1870.

CONTENTS.—I. Our Programme. Introductory remarks by Rud. Virchow. II. The temperature of the cavity of the cranium in normal and pathological states, by Dr E. Mendel, Pankow. III. On the heating and ventilation of the ancients, by Dr Berger, Frankfort-on-Maine. IV. On a cancroid tumour of the cornea and sclerotic; Contribution to the history of the development of cancer, by Dr A. Classen Rostoch (Plate I). V. Neuroma cirsoideum, by Dr Paul Bruns, Tübingen (Pates II. III. and V). VI. On congenital division of the parietal bone by a transverse or oblique suture, by Dr W. Gruber, St Petersburg. VII. On congenital abnormally wide foramina parietalia, by the same. VIII. Smaller communications: (1) Medico-scientific obituary for the year 1869, by Dr W. Stricker, Frankfort-on-Maine; (2) Dilatation and fatal rupture of duodenum, by Dr A. Wernich, Berlin; (3) Some cases of cheilitis glandularis apostematosa (myxadenitis labialis), by Dr R. Volkmann, Halle; (4) On synostosis of the cranial bones, by Dr Frankel, Dessau (Plate VI); (5) Investigations on the action of lukewarm fresh-water baths, and several other baths, by Dr C. Heymann, Wiesbaden; (6) On injection of fungi into the blood of animals, by E. Semmer, Dorpat.

I. In this article Virchow begins with a brief sketch of the history of the "Archiv." It was founded by Benno Reinhardt and himself in the year 1847. The object had in view was to establish a journal for truly scientific *observation* in the domain of pathological anatomy and clinical medicine, because they believed that in this way alone could a science of pathological physiology be founded. At this time there was no such rigidly scientific observation in the German schools. The progress of the journal was slow at first, as it had to contend against established opinion and prejudice, and in 1852 Reinhardt died, leaving Virchow sole editor. The latter believes that the "Archiv" has worked a reformation in German medical literature, by turning attention away from the merely hypothetical and theoretical to the practical observation of facts. It has in this way helped to make German observations respected, and has stimulated scientific enquiry in foreign lands. The success of the journal in late years has been beyond expectation. The author then proceeds to remark the enormous development of specialistic journals which has of late years taken place, and he asserts that there can be no permanent need for such sub-division. The article is finished by some advices to contributors, the chief of which is that on account of the press of material they should make their articles as short as possible.

II. Experiments were made on dogs and rabbits to determine the influence of various narcotics. The temperature of the cranial cavity is always lower than that of the trunk. The results are that chloroform, chloral, and morphia *lower its temperature* both absolutely and relatively to that of the body. Alcohol, on the contrary, in narcotic doses, *raises* the temperature of the brain, so that it may even exceed that of the body.

IV. The author has had the opportunity of observing a case of epithelioma of the cornea and sclerotic, and of examining the tumour after extirpation of the eyeball. He observed that in both the cornea and sclerotic the extension of the tumour was preceded by a rich new formation of bloodvessels, and that the cancer cells take origin from the vicinity of these vessels, not from the epithelial cells on the surface, as Thiersch and Billroth assert. The cells first appear in the form of masses of young lymphoid cells around the vessels, and these develope into the peculiar cancer cells, destroying the corneal tissue through the pressure caused by their increase in size.

VIII. (2) In this case death occurred sixteen hours after the onset of symptoms of peritonitis, which had supervened on prolonged obstruction. The stomach and duodenum were found enormously dilated, and the latter presented a small rupture. The cause of the dilatation and rupture was a stricture at the upper part of the jejunum, depending on an epithelioma. Similar tumours were found in other parts of the small intestine and caput cæcum coli, but especially in the uterus. The cancer in the uterus is looked on as the primary affection, that in the jejunum probably depending on an infected gland.

Vol. L., Part II., May, 1870.

Contents.—IX. On papillary tumours of the pharynx, by Prof. H. v. Luschka, Tübingen (Plate VII). X. Studies on malaria-infection, by Dr Ritter, Oberndorf (continuation from Vol. XLVI., p. 316). XI. Contribution to the literature of Leuchæmia, by Dr E. Salkowski, Königsberg in Prussia. XII. On vaso-motor psychoneuroses, by Hubert Reich, Illenau. XIII. On sand-tumours, by Dr F. Stendener, Halle (Plate VIII., fig. 1 to 5). XIV. On a very long styloid process of the temporal bone, by Dr W. Gruber, St Petersburg (Plate VIII., fig. 6). XV. From the chemical laboratory of the Pathological Institute in Berlin. On hydrate of bromal and its action on the organism of animals and man, by Dr E. Steinauer, Berlin. XVI. The juice of the fruit of momordica elaterium (continuation from Vol. XLIX., p. 434), by Dr H. Köhler, Halle. XVII. Smaller communications: (1) Communications on pathological anatomy from the hospital at Orenburg in Russia, by Dr Burzen; (2) Cases of pluralitas monstrosa, by Dr Fedor Jagor, Berlin, and Ragotzky, priest in Triglitz; (3) Heterotopia of the grey substance of the brain, sclerosis and grey degeneration of the central nervous system in a case of paralysis agitans, by Dr F. Meschede, Schwetz; (4) Supplement to the communication "On albumen in sweat" (Vol. XLVIII., Part I.), by Dr W. Leube, Erlangen; (5) A monster goat fœtus, acardiacus acephalus bipes, by Dr Hauptman, Sorau; (6) Calcification of dead cerebral ganglion-cells, by Rudolf Virchow.

IX. The author remarks the extreme rarity of the occurrence of papillary tumours in the pharynx, and gives two cases.

XI. The general conclusions arrived at from the observation of a case of completely uncomplicated splenic leuchæmia are these:—Relative increase of uric acid in the urine is a constant symptom of splenic leuchæmia; and the assertion of some authors that this depends on imperfect oxidation of the blood, is thought to be very doubtful. It is denied that any intermediate substance in the retrograde metamorphosis of the tissues, which might be referred to the superabundance in the blood of the constituents derived from the spleen, has as yet been proved to exist either in the blood or urine; but a substance similar to hypoxanthin occurs in normal as well as leuchæmic urine. It is possible that besides the splenic and lymphatic there may be a third species of leuchæmia, in which the medulla of bone is involved.

XIII. Three cases of this kind of tumour are related, the growth having been formed in one case in connection with the dura mater of the cerebrum, in another with the choroid plexus, and in the third with the dura mater of the cord.

XV. The experiments and observations detailed in this paper were made under the direction of Liebreich, in Berlin. The hydrate of bromal when administered to animals undergoes a similar change to that undergone by chloral, being converted by the alkalies of the blood into bromoform. But this change goes on slowly, for at the end of an hour and a half there was found in the blood in addition to bromoform still some undecomposed bromal. The substance is further oxidised and evacuated in the urine as bromide. The symptoms produced by bromal on animals (frogs, rabbits, guinea-pigs) were first a stage of restlessness, followed by imperfect sleep and anæsthesia, and finally dsypnœa and death with or without convulsions. After large doses, both in frogs and rabbits, the heart was found after death relaxed and distended,—whereas, after smaller doses it was contracted. In the former case there is probably direct paralysis of the heart by the bromoform, such as occurs after large doses of chloroform. The preliminary stage of restlessness, which has no equivalent after administration of chloral, is ascribed to the action of the bromal aldehyde itself, the decomposition occurring, as stated above, more slowly than is the case with chloral. The author observed a stage of restlessness, after a hypnotic dose of chloral, in a patient suffering under gout, and he ascribed this to the acid state of the blood preventing the usual decomposition into chloroform. With this view he administered alkalis to the patient, and after a few days the same dose of chloral produced the usual hypnotic effect. Proceeding from this, he applied the same principle in his experiments with bromal. Having injected carbonate of soda subcutaneously in rabbits, he then injected the hydrate of bromal, and found that the stage of restlessness was entirely absent. The author has administered bromal to man in only a few cases. He has found good effects from it in epilepsy, and in soothing the pains of tabes dorsalis. The method of administration which he has ultimately employed is, first, in the morning and at mid-day a powder containing about 14 grains sodæ bicarb., then in the evening two to four pills, containing each from ½ grain to 1½ grains of bromal.

REICHERT AND DU BOIS-REYMOND'S ARCHIV FOR ANATOMY, PHYSIOLOGY, AND SCIENTIFIC MEDICINE.

No. I., 1870.

Contents.—I. The terminations of the nerves in smooth muscles, by Dr W. Krause, Göttingen (Plate I., figs. 1 and 2). II. On the termination of the gland-nerves, by Dr W. Krause, Göttingen (Plate I., figs. 3-9). III. The anatomy of the ciliary muscle, by Dr B. Wende. IV. The physiological action of purgatives, a pharmaco-dynamical sketch, by Dr L. Radziejewski, Berlin. V. On the structure of the down of the bittern, by Dr L. Stieda, Dorpat (Plate II). VI. The anatomy of the zygoma of man, by Dr L. Stieda, Dorpat. VII. Contribution to the anatomy of parasitic crabs, by Rob. Hartmann (Plates III. and IV).

IV. This paper records a very elaborate series of experiments on dogs with different purgatives. The principal result come to is that drastics act by increasing the peristaltic action of the intestines, and not by augmenting the transudation through their walls. The contents of the stomach and small intestines are thus rapidly discharged per anum.

The other papers of this number are so purely anatomical, that it is thought unnecessary to abstract them.

TRANSACTIONS OF

The Medico-Chirurgical Society.

SESSION 1869-70.

Tenth Meeting, 6th May, 1870.—Dr Fleming, President, in the chair.

Dr Stirton, Newton Street, and Mr John Dougall, M.B., 119 Paisley Road, were elected ordinary members.

Dr Hugh Thomson read—

REMARKS ON STATISTICS OF MORTALITY.

To ascertain the mortality at any age, we must first make absolutely certain that we have a correct enumeration of the number of persons living at that age. The difficulties to be overcome arose from fluctuations in the number living, arising from various causes (*e.g.*, excess of births over deaths, emigration, &c.) between each census. Scotland is subject to those causes of variation to a greater extent than England, and some parts of Scotland more than others. The mode of estimating the population in the decennial intervals is therefore of fundamental importance. For England this is done simply by counting the excess of births over deaths, but the Registrar for Scotland calculates the annual increase from the last decennial interval, and applies this ratio to each year as it comes round of the current decennial interval. He does not, however, take the ratio for the whole country, but for each town or group of districts by itself. In this way a different ratio is employed for those towns and districts, and in the insular districts it is not an increase but a decrease. But from comparison of the actual with the anticipated ratios, as each successive census is taken, it is found that they do not agree, but each decennial interval shows a rate of increase peculiar to itself. The English method of taking the excess of births corrected by causes of variation, such as emigration, etc., the precise amount of which is known, is much the best, as dealing with facts instead of estimates on a ratio which may be wrong. The chances of error from the Scotch method when applied to large towns are greatly increased. As the Scotch Registrar estimates the increase from the ratio shown by the last census, so he also allots to each age a number proportioned to the number living at that age as fixed by the census. Dr Thomson thought it remarkable that by the census of 1861, the number living under 3 and above 2 is greater than the number living under 2 and above 1 year. A probable explanation was the great excess of births over deaths in 1858 and 1859, the year which would produce the population who were between 2 and 3 years of age in 1861. This would illustrate his objection to the Scotch Registrar's method, because any such peculiarity is stamped through the whole decennial period upon that age. With regard to those living at 1 year and under we would expect it to equal the births during the past year, less the deaths. This, however, is not so. It is less by 3870 than the number so obtained. Emigration accounts for only 543 of this loss. The population, as taken by the census, under 1 year, is therefore not a correct standard for estimating the mortality under 1 year. Again, it is evident that many are born and die within the year who escape the enumeration. The number, therefore, as taken by the census is considerably less than the number producing the deaths; and consequently not the true standard of comparison. He preferred taking the mean of the births of the year in which the deaths occurred and of the year preceding, as giving as nearly as possible the living who furnished the deaths. In one respect the Scotch tables are preferable to the English, in that they show the deaths occurring under 3 months, between 3 and 6 months, and between 6 and 12 months. The great mortality of the first year of life falls upon its first month, and declines month by month thereafter.

Dr Thomson concluded his paper by laying before the Society two elaborate tables illustrative of his views, and showing how greatly different were the results obtained by treating the Registrar's statistics for 1861 and 1867 in the manner proposed by Dr T. as compared with those published.

The tables referred to the death rate under 3, 6, and 12 months for those two years, and the death-rates were contrasted in both sexes over all Scotland, then in the Insular, Mainland, and Town Districts, then in the towns individually. The general conclusion was, that as given by the Registrar the death rates were much too high; in Glasgow, for instance, by so much as 3·756 for males and 2·912 for females in 1861, and by 4·212 for males and 3·464 for females in 1867. But further, Dr T.'s tables showed that while over all Scotland the difference between the Registrar's death rate and that calculated by his method was, though distinct, not very startling in the districts, the difference is quite out of proportion greatest in the towns. We regret that our space will not permit us to give those tables *in extenso*, but we may illustrate this general statement from Dr T.'s table for 1867, taking the males only. Over all Scotland, the Registrar's result for males is in excess of Dr T.'s by 2·935 per cent.; in the Insular districts by 1·217; in the Mainland Rural by 1·899; in the Towns by no less than 4·855. Taking the towns individually, the difference ranges, still for males only, from the lowest 2·222 in Perth, as high as 8·545 in Dundee.

Obituary.

THE LATE DR JAMES FRASER.

The profession in the West of Scotland has lost a highly esteemed representative in James Fraser, M.D., Aberdeen, practitioner at Gatehouse-on-Fleet, Kirkcudbrightshire. The deceased gentleman became Licentiate of the Faculty of Physicians and Surgeons of Glasgow in 1844, and Fellow of the same distinguished body in 1851. In 1854 he took the *summi in medicinâ honores* at King's College, Aberdeen. For some years he filled, with much ability, the posts of Physician and Clinical Lecturer to the Glasgow Royal Infirmary, Government Inspector of Passengers for the Clyde Ports, and President of the Glasgow Medical Society. To the literature of the profession he contributed, "The Emigrant's Medical Guide," and many articles characterized by much research and discrimination in the Edinburgh and Glasgow Medical Journals.—*Lancet.*

Medical Intelligence, &c.

THE UNIVERSITY OF GLASGOW.

Farewell Dinner in the Old College.—The Old College passed into the hands of the City Union Railway Company on the 30th of July. On the 28th the Principal and Professors entertained a select company at a farewell dinner in the Fore-hall. In the absence of Principal Barclay, the chair was taken by Dr Caird. The Chairman proposed "The memory of the Old College," with the sentiment "*Resurgat in gloria, Alma Mater.*"

At the close of the proceedings, the ancient loving-cup was passed round, and all the company joined hands and sang "Auld Langsyne." The chairman's speech was eloquent but cold. We could have wished that the office of chief mourner had been allotted to one who possessed more of the warm heart and tender reverence of the author of "The Essays of Elia," and less of the glacial intellect of the Professor of Divinity. In the words of a leader in the *Glasgow Herald*, in which we recognize the hand of a distinguished son of *Alma Mater*, — "It is a little melancholy to see the Old College, with its Faculties of Divinity, of Literature, of Learning—

> Juristerei, und Medicin,
> Und leider! auch Philosophie—

appearing as if it were wandering away with a satisfied smile, from the misery, the crime, the squalor—in which it has sat helpless since Glasgow began to flourish most—which it has been so little able to touch, and so powerless to subdue." Before these pages have passed into the hands of our readers, the work of demolition will have commenced, and while many of us keenly feel that "all, all are gone, the old familiar faces," it is most befitting the circumstances to look on the achievements of the past in relation to the increased advantages of the future. We may congratulate the Medical Faculty on the honour, not to speak of the good fortune, of having the name of Dr Allen Thomson so indissolubly associated with the new College on Gilmorehill. The fact that he has been the guiding spirit in the construction of the new buildings insures that the special interests of the Medical School have received special attention. We may be allowed to take to ourselves, with peculiar emphasis, the concluding sentence of Dr Caird's speech, and to hope that for the Faculty of Medicine the new College may prove to be "a place where we shall be raised by the simplicity of our objects above vulgar and sordid motives and be constantly stimulated by the splendour of our traditions and the largeness of our opportunities to greater and more self-denying efforts for the good of mankind."

GLASGOW ROYAL INFIRMARY.

Addition to the Medical Staff.—In accordance with the recent resolution of the Managers to increase the Medical Staff, Dr Scott Orr has been elected Physician, and Dr James Morton, Surgeon, under the new regulations.

Additions to Buildings.—The Managers are about to erect new buildings for the Dispensary, Dormitories for Nurses, and a House for the Superintendent. All these additions are necessary, and will be found to be improvements as regards the administration of the institution, but in a hygienic aspect, their necessity is to be regretted. The limited site occupied by the Royal Infirmary is already over-built, and from the peculiarities of its boundaries preventing the distribution of the buildings in such a way as to admit of the free circulation of the atmosphere, the plan of the Hospital has gradually become that of a huge box surrounding the central area. It is not easy to advise the Managers how to improve their position, but we cannot help expressing our anxiety as to the ultimate result on the salubrity of the institution.

RELAPSING FEVER IN GLASGOW.

The appearance of this disease in our city ought to have been noted in last number. We extract the following from the "Annual Report of the City of Glasgow Fever Hospital." After giving a history of the outbreak of Relapsing Fever on the Continent, and its subsequent passage to London and thence to Edinburgh, and pointing out how in all its progress this fever has been more or less associated with extreme destitution, the report proceeds:—

"The appearance and social condition of the first victims of Relapsing Fever in Glasgow were quite in accordance with universal experience. On 16th March, 1870, the inmates, four in number (a man aged 50, and three sons), of a room at 7 Muirhead Street, Gorbals, were admitted to this Hospital suffering from a fever which soon declared itself to be Relapsing. On the 28th a boy was admitted from the same number with the same disease. These were the first cases seen in Hospital in Glasgow. There is every probability that the first family (the M'G.'s) were the very first in the city. They were miserably clad, hollow-cheeked, and wretched in bodily condition. I [Dr Russell] visited the locality with the district inspector. The M'G.'s house was shut up, all its inmates being in Hospital. That from which the boy, John S. was removed, I found occupied by his mother, her infant, and a younger son. The woman was so insufficiently clad, that she held about her person during my visit what seemed to be a bedcover. There was not 'a stick of furniture' in the house. The only bedding was a bag of straw, on which the infant was sleeping, covered with a ragged towel. The mother was gaunt, sallow, and dirty. The husband, I was informed, is a drunkard. Minute inquiry was made into the origin of the fever, and we got at once an account of a man who walked from Bathgate, and was allowed to sleep in M'G.'s house, where he became ill, and lay during his illness, which was marked by great thirst and perspirations. He had been ill in Bathgate, and came primarily from Edinburgh. It is therefore probable that this man caught Relapsing Fever in Edinburgh, had his first attack in Bathgate, walked in the non-febrile interval to Glasgow, had the Relapse in the house of these M'G.'s, and so planted the disease there. The family of J. S. was intimate with that of the M'G.'s, and no doubt were infected by the intercourse of the boys of the two families.

"The ultimate development of Relapsing Fever in Glasgow remains to be seen. The soil is unfavourable for it. The pauper rolls of the parishes of Glasgow show that there is much less poverty in the community than there was last year. Labour is abundant, from the variety of manufactures to be found in Glasgow; so that, when one fails, recourse can be had to another by those out of employment. Whatever overcrowding there may be, will, however, expose those who are not, so to speak, the natural prey of Relapsing fever to infection, seeing that it is now among us. So far as it has gone the majority of the cases have come from the Central District; and they present such an admixture of the very wretched with the comparatively well-conditioned as we should expect. It is remarkable that most of the fresh centres of infection have been associated with the reception of lodgers; and that, once introduced in this way into a family, this fever seems to seize all its members, with a rapidity and certainty which Typhus rarely exhibits. In no case as yet have the two diseases been associated, or in any way intermingled."

THE CITY OF GLASGOW SANITARY DEPARTMENT.

We have before us a neat little pocket-volume issued by the City of Glasgow Sanitary Department, containing "Instructions for the Medical, Inspecting, and Cleansing Officers." Besides directions for the very complete staff of officials to whose care the health of the community in its various relations is entrusted, there is an appendix containing extracts from the various Acts of Parliament from which those officials derive their authority, and whose enactments it is their duty to enforce. A map of the city is also given. This book and the organization which it is intended to instruct originated in the extraordinary attention directed by the high mortality of the first quarter of the year 1869, to the sanitary condition of the city, and in the subsequent visit of a deputation of the authorities to Bristol. While we are sure nothing but good can result from such an organization, we hope the public have not been led to expect too much and too soon from its action. The evils which have to be remedied in Glasgow are the product of many years, and their cure cannot be effected in a day.

GLASGOW MATERNITY HOSPITAL. QUARTERLY REPORT,

From February 15th, 1870, to May 15th, 1870.

The subjoined tabulated statement presents an analysis of the obstetric practice of this hospital during the quarter ending 15th May, 1870. It will be observed that of the 299 women who were delivered only one maternal death occurred. This was a case of *post partum* hœmorrhage, terminating in septicæmia. It may be mentioned that the hospital during the past quarter enjoyed great immunity from disease. The number of operative cases was considerably below the average.

	MOTHERS.				INFANTS, &c.												Maternal Deaths.
	No.	Social Condition.			No.	Males.		Females.					Presentation.		Operative Cases.		
		Married.	Widows.	Single.		Alive.	Still-born.	Alive.	Still-born.	Twins.	Premature.	Abortion.	Normal.	Abnormal.	Forceps.	Version.	
In-door	93	14	4	75	96	48	1	43	4	3	3	0	88	8	2	1	0
Out-door	206	170	2	34	209	82	15	98	14	1	10	2	196	11	1	1	1
Total.....	299	184	6	109	305	130	16	141	18	4	13	2	284	19	3	2	1

Average weight of child at full time over 93 cases, 6·87 lbs.
" length " " " 19·1 inches.
" weight of placenta " " 1·2 lbs.
" length of cord " " 20·07 inches.

Average Duration of Labour.

Primiparæ (41 cases).	Multiparæ (52 cases).
1st stage 10·8 hours.	1st stage 7·43 hours.
2nd " 2·4 "	2nd " 1·16 "
3rd " 9·8 minutes.	3rd " 10 minutes.

Greatest weight of child at full time, 10 lbs.
Least weight " " 2 lbs.
Greatest length " " 22 inches.
Least length " " 15 inches.
Greatest weight of placenta, - - 2 lbs.
Least " " - - ¾ "
Greatest length of cord, - - - - 30 inches.
Least " " - - - - - 10 "

PAISLEY INFIRMARY ANNUAL REPORT.

During the year 1869 this Institution treated 6106 patients, viz., 913 in the Hospital, 5007 at the Dispensary, and 186 at their own houses. The income exceeded the expenditure by £80. The Directors justly direct attention to the yearly increase in the amount of the Worker's Contributions. The same observation is made by the managers of our own Infirmary. This spirit of self-help and desire to provide for the evil day, is a pleasing feature in the character of our artisans and labourers. Surely there is some error in the classification of the fevers, of which there were 53 "*simple continued*," to 76 "Typhus," and 63 "Enteric." Murchison in his *Report of the London Fever Hospital for* 1869 states that the number of cases of simple continued fever was just 53 out of above 3000 cases of well-marked specific fevers. This also agrees with the experience of the Glasgow Hospitals. Murchison significantly remarks,—"This disease is never fatal in the London Fever Hospital, although the number of deaths weekly referred to it by the Registrar-General equal, if they do not exceed, those of either typhus or enteric fever."

THE GREENOCK HOSPITAL AND INFIRMARY—ANNUAL REPORT.

We are glad to learn that the cost of the new Hospital recently erected at Greenock, amounting to £17,250, has already been fully subscribed. Two distinct epidemics, fever and small-pox, prevailed in Greenock during 1869. This accounts for the large number of 618 cases admitted to the Fever-house. Of these 441 were cases of Typhus and the mortality was 11 per cent. The Greenock experience of small-pox is valuable. *Only 11 per cent. of the cases admitted were vaccinated.* The mortality was 11·66 per cent., and "*no deaths occurred in the vaccinated cases.*" The Directors very properly were induced by these facts to stimulate the local authority to the enforcement of the preventive powers vested in them. The ordinary Medical and Surgical work of the Greenock Infirmary was proportionally extensive during the year. In giving this short survey, there is only one regret to which we must give expression, and it is this, that in the professional fruits gathered by the Medical Officers we have not participated. We hope that the pages of our next volume will be enriched by contributions from the enviable field of observation which those privileged gentlemen enjoy.

BOOKS, PAMPHLETS, ETC., RECEIVED.

We have been obliged to keep back the list of Books, Pamphlets, &c., received, until next number.

GLASGOW:
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